BANGERTER

13400 SOUTH

APPENDICES



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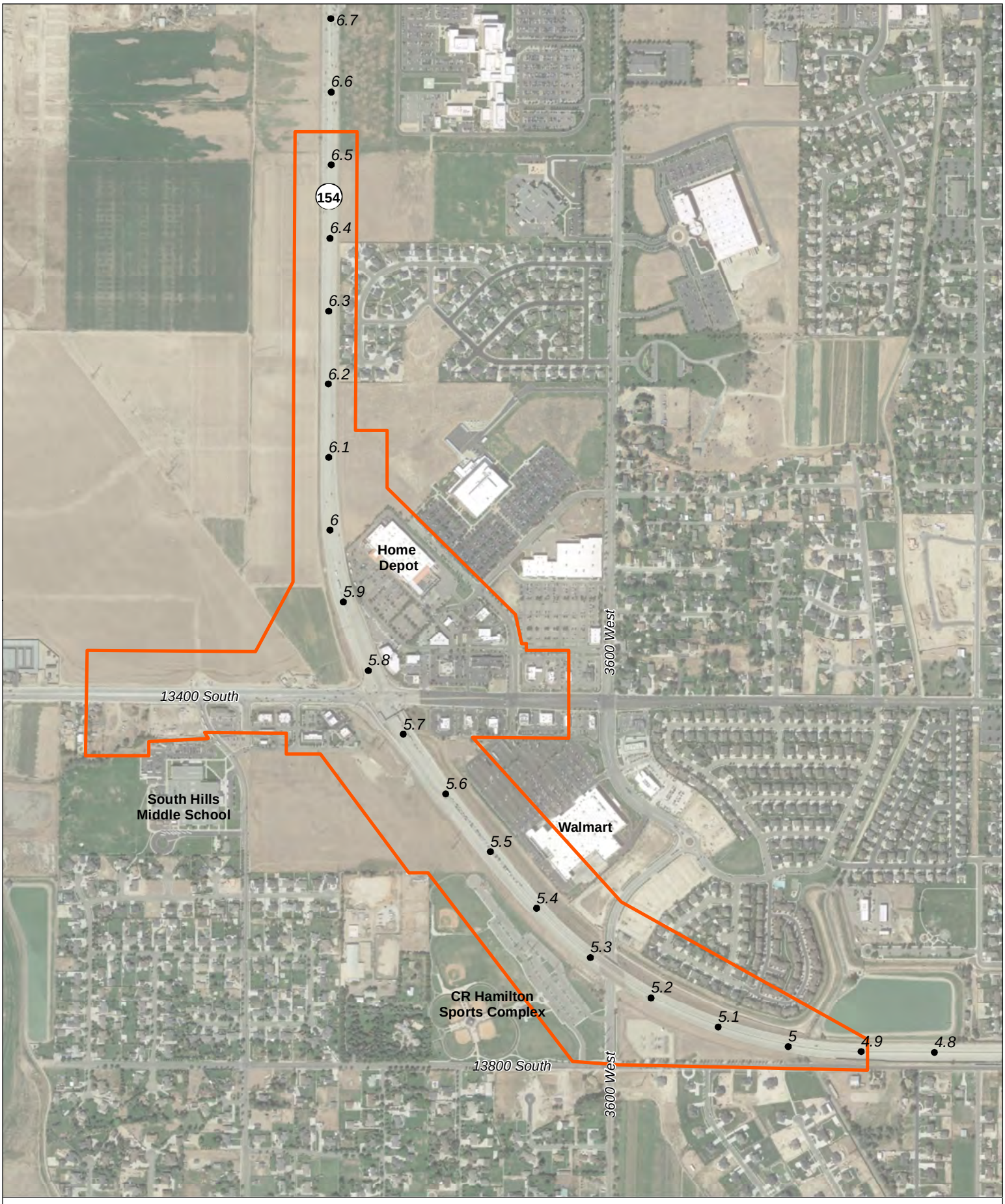
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Appendix A: Project Figures

Study Area Map



Legend

- Tenth Milepost
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18808: Bangerter Highway at 13400 South

Study Area

0 0.125 0.25 Miles

Appendix A: Project Figures

Bangerter Highway Over Option Map

BANGERTER OVER OPTION

Existing Privacy Wall* - 6 ft
Replace In-Kind - 6 ft

Existing Privacy Wall - 6 ft
Remain In Place

Bangerter Highway

13400 South

Home Depot

South Hills Middle School

Innovation Drive Commercial Area

Market Center Commercial Area

Detention Basin

LEGEND

- Partial Acquisitions
- Full Acquisitions
- ROW Coordination Req'd
- Existing Walls - Remain
- Existing Privacy Wall* - Replace
- Proposed Noise Wall* (Pending Funding)
- Auxiliary Lane Pavement* (Pending Funding)
- Mainline Pavement* (Pending Funding)
- Rose Creek Relocation
- Rose Creek
- Detention Basins

*Some of the improvements identified will not be constructed unless additional funding is secured.

BANGERTER OVER OPTION

Bangerter Highway

Walmart Supercenter

Detention Basin

114 113 111 112 110 109 108 107 106 105 104 102 100 103 101

Proposed Noise Wall
(Pending Funding) - 14 ft
Bridge Noise Wall 6 ft

Existing Noise Wall
Remain In Place
North Wall - 15 ft
South Wall - 12 ft

LEGEND

- Partial Acquisitions
- Full Acquisitions
- ROW Coordination Req'd
- Existing Walls - Remain
- Existing Privacy Wall* - Replace
- Proposed Noise Wall* (Pending Funding)
- Auxiliary Lane Pavement* (Pending Funding)
- Mainline Pavement* (Pending Funding)
- Rose Creek Relocation
- Rose Creek
- Detention Basins

*Some of the improvements identified will not be constructed unless additional funding is secured.

Appendix A: Project Figures

Bangerter Highway Under Option Map

BANGERTER UNDER OPTION

Existing Privacy Wall* - 6 ft
Replace In-Kind - 6 ft

Existing Privacy Wall - 6 ft
Remain In Place

Bangerter Highway

13400 South

Home Depot

South Hills Middle School

Innovation Drive Commercial Area

Detention Basin

Market Center Commercial Area

LEGEND

- Partial Acquisitions
- Full Acquisitions
- ROW Coordination Req'd
- Existing Walls - Remain
- Existing Privacy Wall* - Replace
- Proposed Noise Wall* (Pending Funding)
- Mainline Pavement* (Pending Funding)
- Auxiliary Lane Pavement* (Pending Funding)
- Rose Creek Relocation
- Rose Creek
- Detention Basins
- Utilites Realignment
- Sewer Realignment

*Some of the improvements identified will not be constructed unless additional funding is secured.

BANGERTER UNDER OPTION

Bangerter Highway

Walmart Supercenter

Detention Basin

114 113 111 112 110 109 108 107 106 105 104 102 100 103 101

Proposed Noise Wall
(Pending Funding) - 18 ft
Bridge Noise Wall 6 ft

Existing Noise Wall
Remain In Place
North Wall - 15 ft
South Wall - 12 ft

N

LEGEND

- Partial Acquisitions
- Full Acquisitions
- ROW Coordination Req'd
- Existing Walls - Remain
- Existing Privacy Wall* - Replace
- Proposed Noise Wall* (Pending Funding)
- Mainline Pavement* (Pending Funding)
- Auxiliary Lane Pavement* (Pending Funding)
- Rose Creek Relocation
- Detention Basins
- Rose Creek

*Some of the improvements identified will not be constructed unless additional funding is secured.

Appendix A: Project Figures

Bangerter Highway Hybrid Option Map

BANGERTER HYBRID OPTION

Existing Privacy Wall* - 6 ft
Replace In-Kind - 6 ft

Existing Privacy Wall - 6 ft
Remain In Place

Bangerter Highway

13400 South

Home Depot

South Hills Middle School

Innovation Drive Commercial Area

Detention Basin

Market Center Commercial Area

115 116 117 118 119 120 121 122 123 123B 124 125 126 127 128 129 130 131 132 133 134 135 136 137 138 139 140 141 142 143 144 145 146 147 148 149 150 151 152 153 154 155 156 157

LEGEND

- Partial Acquisitions
- Full Acquisitions
- ROW Coordination Req'd
- Existing Walls - Remain
- Existing Privacy Wall* - Replace
- Proposed Noise Wall* (Pending Funding)
- Mainline Pavement* (Pending Funding)
- Auxiliary Lane Pavement* (Pending Funding)
- Rose Creek Relocation
- Rose Creek
- Detention Basins

*Some of the improvements identified will not be constructed unless additional funding is secured.

BANGERTER HYBRID OPTION

Bangerter Highway

Walmart Supercenter

Proposed Noise Wall
(Pending Funding) - 18 ft
Bridge Noise Wall 6 ft

Existing Noise Wall
Remain In Place
North Wall - 15 ft
South Wall - 12 ft

Detention Basin

114 113 111 112 110 109 108 106 107 102 105 104 100 103 101

LEGEND

- Partial Acquisitions
- Full Acquisitions
- ROW Coordination Req'd
- Existing Walls - Remain
- Existing Privacy Wall* - Replace
- Proposed Noise Wall* (Pending Funding)
- Mainline Pavement* (Pending Funding)
- Auxiliary Lane Pavement* (Pending Funding)
- Rose Creek Relocation
- Rose Creek
- Detention Basins

*Some of the improvements identified will not be constructed unless additional funding is secured.

Appendix B: Traffic and Design

Bangerter Highway & 13400 South Existing and 2050 No Build Traffic Analysis

MEMORANDUM

To: UDOT Region Two & Environmental

From: Avenue Consultants

Date: December 20, 2021

Subject: Bangerter Highway & 13400 South Existing and 2050 No Build Traffic Analysis

The Utah Department of Transportation (UDOT) is performing an environmental study for a potential new interchange on Bangerter Highway at the existing 13400 South at-grade intersection. This memorandum summarizes the traffic evaluation for existing and future (2050) no build conditions within the study area. For this analysis, the study area consists of the Bangerter Highway corridor from 12600 South to 2700 West and the 13400 South corridor from 4050 West to Hamilton View Road (3600 West), as illustrated in **Figure 1**.



Figure 1: Bangerter Highway and Adjacent Intersections Study Area

1 ANALYSIS METHODOLOGY

The analysis described in this memorandum utilized project traffic data, Vissim traffic operations software and the Wasatch Front Regional Council (WFRC) / Mountainland Associated of Governments (MAG) travel demand model for year 2050 traffic forecasts. This section describes how each of these tools were implemented for this project.

1.1 Travel Demand Modeling

The WFRC/MAG travel demand model (TDM) is a tool used to predict future travel and traffic volumes for the Wasatch Front area. The TDM is jointly owned and maintained by the WFRC and the MAG, which are the Metropolitan Planning Organizations for the Wasatch Front and are responsible for coordinating transportation

planning in the region. WFRC is responsible for Weber, Davis, and Salt Lake Counties and MAG for Utah County. Version 8.3.1 of the TDM was used for this study.

The travel demand model has two primary inputs: land use data and transportation system data. The land use data consists of residential and employment data for the entire region. This data is prepared in geographic blocks called Traffic Analysis Zones (TAZs). The travel model inputs are prepared for a base year, which in this case was 2019, and for a future year, which in this case was 2050. A base year of 2019 was used because both travel model socioeconomic inputs and published traffic volume data are available for that year. In travel modeling, the base year always lags the current year by a few years because of the need to have land use input and calibration data.

To prepare the model for use, several TAZs were split in the study area and added corresponding roads to improve the resolution of the model in the area and to reflect local travel patterns more accurately. A figure showing the TAZ splits in the study area can be found in Appendix A: Traffic Analysis Zones.

To validate the model for the study area, base year model volumes were compared to published traffic volumes. Free flow speeds on some roadways in the study area were adjusted to bring the model volumes closer to the observed volumes. The most common measure for model validation purposes is the Percent Root Means Square Error (RMSE). RMSE is a measure of the accuracy of traffic assignment that measures the average error between the observed and modeled traffic volumes on roadway links with traffic counts. For model validation, traffic counts from UDOT's Traffic on Utah Highways were utilized. These counts provide Annual Average Daily Traffic (AADT) on state highways and federal aid roads. These AADTs were used to estimate Average Weekday Daily Traffic (AWDT) traffic for comparison to the travel model output using statewide traffic factors provided to UDOT. **Table** 1 summarizes the RMSE for Bangerter Highway and cross streets from I-15 to I-80. Overall, 89 roadway segments were evaluated and the TAZ splits along with speed adjustments reduce the RMSE on these corridors compared to the base model.

Table 1: Bangerter Highway and Cross Streets - Percent Root Means Square Error

Vehicles per Day	# of Links	2019 WFRC Base Model	2019 Revised Model
0-9,999	16	176%	125%
10,000-19,999	7	23%	16%
20,000-29,999	16	35%	36%
30,000-49,999	28	33%	25%
50,000-59,999	8	16%	14%
60,000+	14	23%	17%
Area Wide	**89**	**32%**	**25%**

In consultation with region's cities, WFRC and MAG prepare future land use projections. These projections are used by the MPOs to develop the Regional Transportation Plan (RTP), which is the plan for the development of the future transportation system. The RTP includes a list of projects that are planned to meet future transportation needs over a 30+ year horizon.

Although WFRC coordinates with local jurisdictions in preparation of the land use projections, some adjustments were made to the 2050 projections in West Valley City and southwest Salt Lake County. Because of their proximity to the 13400 South study area, the southwest Salt Lake County adjustments are described in a little more detail.

The adjustments in southwest Salt Lake County are based on the latest approved plans for Olympia Hills and Daybreak and reflect additional households and employment beyond the RTP. A comparison of the differences is presented in **Table 2** for specific areas**.** The East Daybreak area is the only in between Bangerter Highway and Mountain View Corridor (MVC). The other areas are all west of MVC with the Midas area largely being west of Bacchus Highway and associated with land own by Rio Tinto.

Table 2: Southwest Salt Lake County Households and Employment Modifications Summary

Area	# of TAZs	2050 Households		2050 Employment	
		RTP Households	Adjusted Households	RTP Employment	Adjusted Employment
Midas	10	3,692	3,881	5,682	5,902
West Daybreak	13	6,000	8,124	11,123	10,773
East Daybreak	23	9,718	11,557	9,972	10,636
Northeast Herriman	7	6,598	6,270	1,746	1,746
Olympia Hills	2	2,769	6,801	330	2,473
Total	**55**	**28,778**	**36,633**	**28,853**	**31,530**

1.2 Traffic Operations Analysis

The Vissim software was selected for this study because it allows for the evaluation of freeways, closely spaced intersections, and the interaction between the two facilities. Vissim allows for driving behaviors to be modified, can collect travel time data for user-specified segments and can measure queue lengths at study intersections, which collectively are used to calibrate the model to observed conditions.

Existing traffic signal timing data were obtained from the UDOT Traffic Operations Center and used in modeling signalized intersections in Vissim. The intersections within the study area were modeled according to existing geometry and speeds. The study area was modeled as a network; however, the analysis was completed for each intersection independently.

1.2.1 Traffic Volumes / Data Collection

Turning movement counts were collected on Thursday, April 27, 2021, for the AM (7:00-9:00) and PM (4:00-6:00) peak periods at the study intersections shown in **Figure 2**. To account for reduced volumes due to the Covid-19 pandemic, two different approaches were utilized. The first was to simply compare the 2021 traffic intersection counts to pre-pandemic counts at that same location. Generally, the volume for each turning movement were compared between the available counts and the large volume was selected for use. The second approach was used at locations for which previous intersection counts were unavailable. In these cases, volume adjustment factors were developed using current and historic traffic volume data obtained from UDOT's Automated Traffic Signal Performance Measures (ATSPM) system. These data showed that the 2021 count volumes were approximately 12% lower than pre-pandemic volumes for the AM peak hour and 5% lower for the PM peak hour. Thus, the 2021 volumes were increased by 12% and 5% for the AM and PM peak hours, respectively.

The adjusted turning movement traffic volumes were balanced throughout the study area so that the volume exiting one intersection was the same as the volume arriving at the next intersection to create the existing AM and PM peak hour volumes to be used for the traffic analysis. A figure showing the existing intersection traffic volumes can be found in Appendix B: Peak Hour Traffic Volumes.

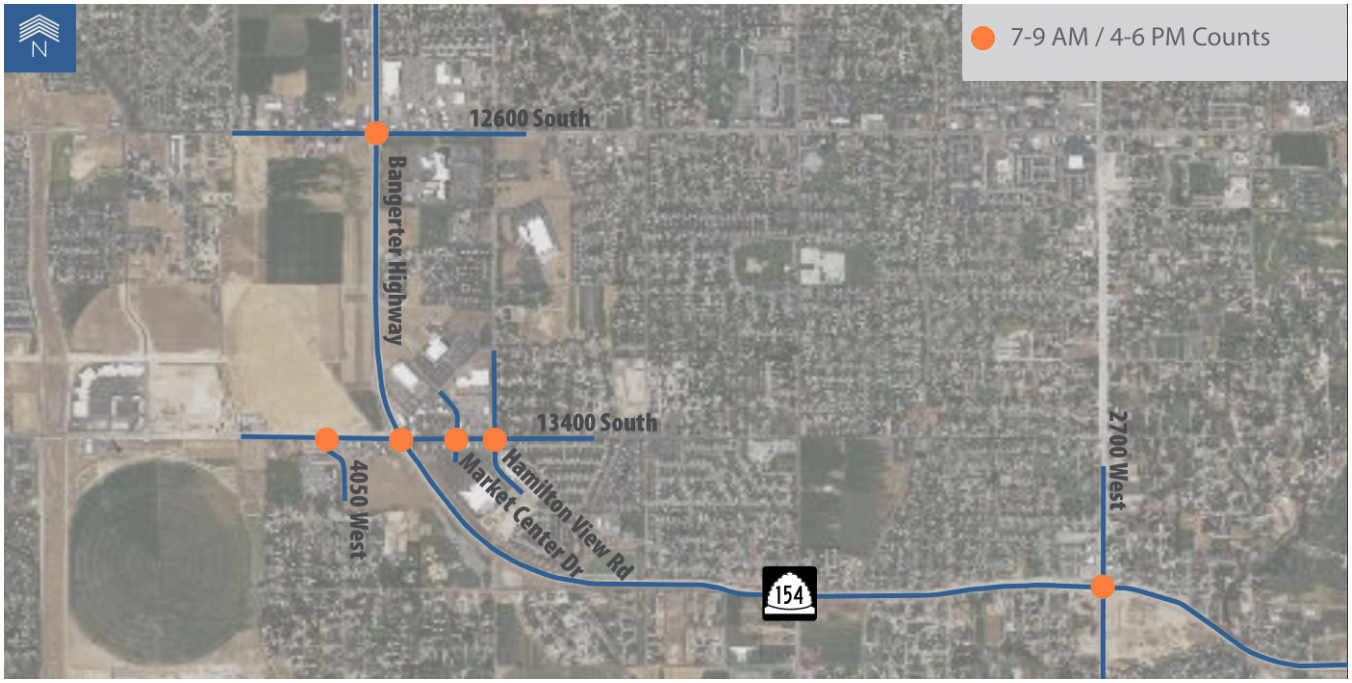


Figure 2: Intersection Turning Movement Count Locations

The future AM and PM peak hour volumes were developed for year 2050 using principles described in the National Highway Cooperative Research Program (NCHRP) Report 255 document. The forecast peak period intersection volumes were developed from the existing peak hour traffic volumes and data from the WFRC/MAG travel demand model. The travel model was run for the base year (2019) and for the future year (2050) and the difference between these models was used to estimate the traffic growth, which was applied to the existing traffic volumes. The future volumes were then balanced to ensure the correct number of inbound and outbound vehicles on each leg of the intersection. Included in Appendix B: Peak Hour Traffic Volumes are figures presenting the resulting 2050 No Build traffic volumes used for the traffic analysis.

1.2.2 Measures of Effectiveness

The operational analysis is based upon Vissim output correlated to the *Highway Capacity Manual (HCM) 6th Edition* methodologies, which describes how transportation system performance can be measured and ranked by level of service (LOS). LOS is measured quantitatively and reported on a scale from A to F, with A representing the best performance and F the worst.

The primary measure of effectiveness for this study was intersection performance. For intersections LOS is based on average vehicle delay measured in seconds per vehicle. Delay and LOS are determined for each turning movement, approach, and the overall intersection. For signalized intersections, the overall intersection LOS is most commonly reported. **Table 3** provides details regarding LOS criteria thresholds for signalized intersections.

Table 3. Intersection Level of Service Criteria

Level of Service	Traffic Conditions	Average Delay (seconds/vehicle)	
		Unsignalized	Signalized
A	Free Flow Operations / Insignificant Delay	0 ≤ 10	0 ≤ 10
B	Smooth Operations / Short Delays	>10.0 and ≤ 15.0	> 10 and ≤ 20
C	Stable Operations / Acceptable Delays	>15.0 and ≤ 25.0	> 20 and ≤ 35
D	Approaching Unstable Operations / Tolerable Delays	>25.0 and ≤ 35.0	> 35 and ≤ 55
E	Unstable Operations / Significant Delays Begin	>35.0 and ≤ 50.0	> 55 and ≤ 80
F	Very Poor Operations / Excessive Delays Occur	> 50.0	> 80

Source: Highway Capacity Manual 6th Edition*, Transportation Research Board National Research Council, Washington D.C*

Another important measure of effectiveness is 95th percentile queue length for each turning movement and is the vehicle queue distance that will only be exceeded five percent of the time during the analysis period and helps identify issues such as queuing between intersections and queues that exceed their turning movement storage.

1.2.3 Model Calibration

Vissim model calibration focused on matching observed queues, travel times, and vehicle behavior to observed conditions. The objective of the model calibration was to obtain the best match possible between model results and the field data. The traffic model calibration focused on matching traffic volumes, observed queues, and vehicle behavior to existing travel patterns within the study area. During the Vissim calibration, model outputs were compared against field data to determine if the model output reflected observed traffic conditions and driving behaviors were adjusted as necessary to replicate existing travel times, delays, and queues.

It was determined through the calibration effort that the Vissim parameters for additive and multiplicative part of safety distance needed to be increased to replicate existing queues and travel times along CFI crossover at 13400 South and Bangerter Highway, and along east-west approaches of 13400 South. Look ahead distance, priority rules and conflict areas were also used to help mimic existing driver behavior between intersections and driveways to prevent unrealistic gridlocked conditions in the model.

2 EXISTING AND 2050 NO BUILD ANALYSIS RESULTS

The analysis results presented in this section include intersection delay, intersection LOS, and 95th percentile queue lengths. For each Vissim analysis (e.g., Existing Conditions, 2050 No Build), the model was run enough times to produce statistically significant results (10 times with a GEH statistic of less than 5) and the results averaged.

2.1 Existing Conditions

The estimated existing delay and LOS for the study intersections are shown in **Table 4**, while **Figure 3** shows similar information. During the AM and PM peak hour the study intersections on 13400 South operate at LOS D or better except for Bangerter Highway which operates at LOS E for both the AM and PM peak hours.

Table 4. Existing Intersection Level of Service and Delay

Intersection	LOS / Delay (sec / hr)	
	AM Peak Hour	PM Peak Hour
12600 South & Bangerter Hwy	D / 46	F / 99
13400 South & Bangerter Hwy	E / 58	E / 64
2700 West & Bangerter Hwy	E / 74	D / 52
13400 South & 4050 West	C / 23	B / 11
13400 South & Market Center	B / 11	C / 28
13400 South & Hamilton View	B / 20	D / 47



Figure 3: Existing AM and PM Peak Hour Intersection LOS

Individual intersection turning movements of LOS E or F at Bangerter Highway & 13400 South are summarized in **Table 5**. For the AM peak hour, there are five movements at LOS E or F and during the PM peak hour there are seven. These movements include almost all the left turns and the westbound and the eastbound throughs during AM and PM peak hours, respectively. Details of the existing delay and LOS for each intersection turning movement is summarized in Appendix C: Existing Intersection Movement Level of Service.

Table 5. Existing 13400 South & Bangerter Hwy Movement Level of Service at LOS E/F

Location	AM Peak Hour		PM Peak Hour	
	Movement	LOS / Delay[1]	Movement	LOS / Delay[1]
13400 South & Bangerter Hwy	Northbound Left	F / >180	Northbound Left	F / 87
13400 South & Bangerter Hwy	Southbound Left	F / 157	Northbound Through	E / 74
13400 South & Bangerter Hwy	Eastbound Left	F / 146	Northbound Right	E / 56
13400 South & Bangerter Hwy	Westbound Left	E / 71	Southbound Through	F / 85
13400 South & Bangerter Hwy	Westbound Through	E / 59	Eastbound Left	F / 167
13400 South & Bangerter Hwy	-	-	Eastbound Through	E / 62
13400 South & Bangerter Hwy	-	-	Westbound Left	F / 92

1. Average delay reported in seconds/vehicle

Estimated 95th percentile queue lengths are presented in **Table 6** for the three Bangerter Highway intersections in the study area. On 13400 South itself, the only substantial queuing occurs at Bangerter Highway during the AM peak hour for the eastbound approach. This queueing is due to heavy eastbound left turn movement which fills the storage and occasionally blocks the through lane. On Bangerter Highway, major queueing occurs at 13400 South for the northbound left movement during both the AM and PM peak hours. Additionally, at 2700 West, there is substantial queuing of approximately 3,000 feet for the eastbound approach during the AM peak hour and for the westbound approach during the PM peak hour.

Table 6. Existing 95th Percentile Queue Lengths

Intersection	Approach	AM Existing (feet)	PM Existing (feet)
13400 South & Bangerter Hwy	Northbound	1,150	1,050
13400 South & Bangerter Hwy	Southbound	575	500
13400 South & Bangerter Hwy	Eastbound	875	450
13400 South & Bangerter Hwy	Westbound	175	450
12600 South & Bangerter Hwy	Northbound	325	3,775
12600 South & Bangerter Hwy	Southbound	525	1,350
12600 South & Bangerter Hwy	Eastbound	1,000	325
12600 South & Bangerter Hwy	Westbound	225	700
2700 West & Bangerter Hwy	Eastbound	3,625	650
2700 West & Bangerter Hwy	Westbound	400	3,175

2.2 2050 No Build Conditions

For the 2050 No Build evaluation, the traffic analysis focused on the 13400 South intersections. The 2050 analysis assumes that all projects in the WFRC RTP will be built with the exception of the interchange at the intersection of Bangerter Highway and 13400 South, which is the subject of this study. As previously stated, the future 2050 volumes were forecast using the TDM. Planned transportation projects near the study area are shown in Appendix D: Planned Transportation Projects and include:

- Mountain View Corridor (MVC) as a freeway *(RTP Project R-S-102 & R-S-103)*
- Reversible lanes on 12600 South between Bangerter Hwy and Mountain View Corridor (MVC) (*RTP Project R-S-68)*
- Widen 12600 South to seven lanes between Bangerter Hwy and MVC (*RTP Project R-S-67)*
- 13400 South as a local expressway between MVC and Bangerter Hwy *(RTP Project R-S-74)*
- Bangerter Highway as a freeway except for 13400 South
- Construction of 4000 West/4050 West as a four-lane road between 12600 South and 13400 South, which will convert the existing 4050 West intersection on 13400 South from a three-way intersection to a four-way intersection *(RTP Project R-S-109)*
- Redwood Road widening to seven lanes from Bangerter Highway to Porter Rockwell Boulevard *(RTP Project R-S-122)*
- 4000 West/4050 West widening to four lanes from 11800 South to 12600 South *(RTP Project R-S-110)*

As presented in **Table 7**, by 2050 the CFI at 13400 South and Bangerter Highway is anticipated to operate at LOS F with extreme delays in both the AM and PM peak hours if no changes are made to the intersection. All the study intersections on 13400 South are projected to perform at LOS F during at least one peak hour due to queueing from the Bangerter intersection spilling through the adjacent intersections. Intersection LOS for the 2050 No Build AM and PM peak hours for the 13400 South study intersections is shown in **Figure 4**.

Table 7. 2050 No Build Intersection Level of Service & Delay

Location	LOS / Delay (sec / hr)	
	AM Peak Hour	PM Peak Hour
13400 South & 4050 West	F / >180	F / >180
13400 South & Bangerter Hwy	F / >180	F / >180
13400 South & Market Center Dr	F / 97	D / 44
13400 South & Hamilton View Rd	F / 107	F / >180

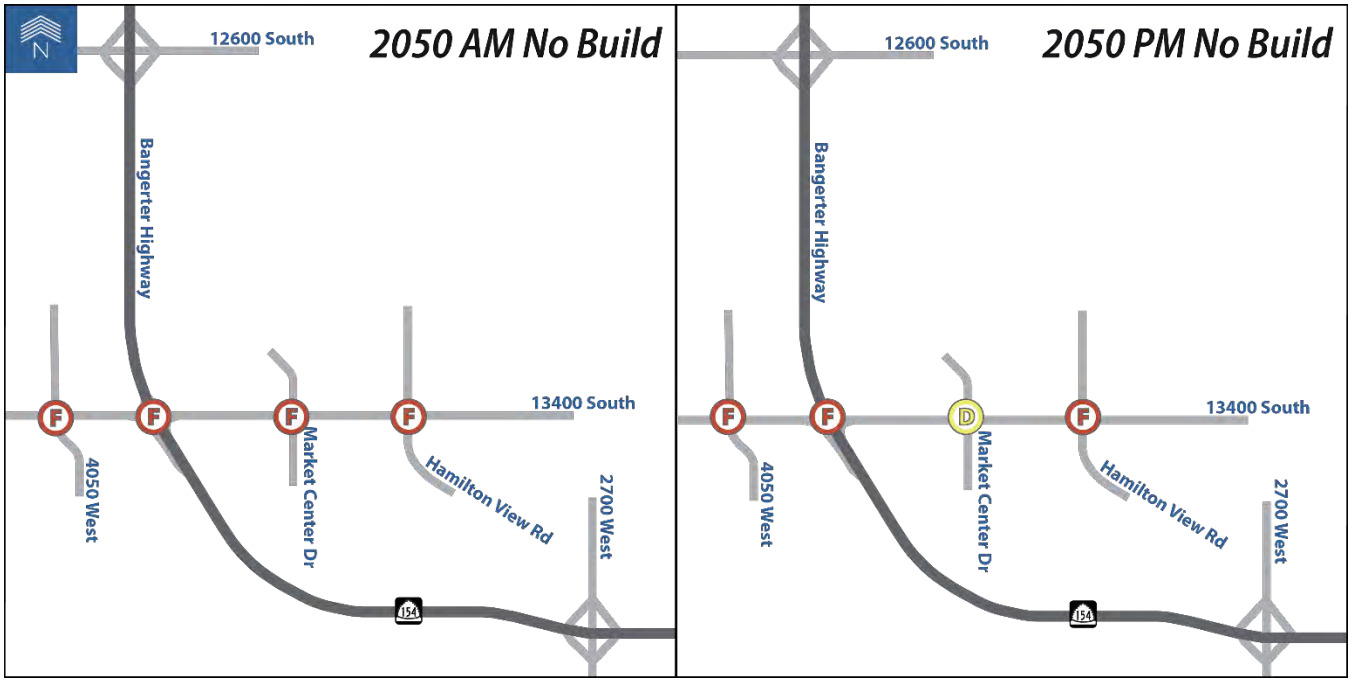


Figure 4: 2050 No Build AM and PM Peak Hour Intersection LOS

Individual turning movements at 13400 South and Bangerter Highway that are expected to operate at LOS E or F in the 2050 No Build alternative are summarized in **Table 8**. For both the AM and PM peak hours, eleven of the twelve possible movements are expected to operate at LOS E or F. Most of the movements would have extreme delays of over three minutes per vehicle. Details of the 2050 No Build delay and LOS for each intersection turning movement are summarized in Appendix E: 2050 No Build Intersection Movement Level of Service.

Table 8. 2050 No Build 13400 South & Bangerter Hwy Movement Level of Service at LOS E/F

Location	AM Peak Hour		PM Peak Hour	
	Movement	LOS / Delay[1]	Movement	LOS / Delay[1]
13400 South & Bangerter Hwy	Northbound Left	F / >180	Northbound Left	F / >180
13400 South & Bangerter Hwy	Northbound Through	F / >180	Northbound Through	F / >180
13400 South & Bangerter Hwy	Northbound Right	F / >180	Northbound Right	F / >180
13400 South & Bangerter Hwy	Southbound Left	F / >180	Southbound Left	F / >180
13400 South & Bangerter Hwy	Southbound Through	F / >180	Southbound Through	F / >180
13400 South & Bangerter Hwy	Southbound Right	F / >180	Southbound Right	F / >180
13400 South & Bangerter Hwy	Eastbound Left	F / >180	Eastbound Left	F / >180
13400 South & Bangerter Hwy	Eastbound Through	F / 133	Eastbound Through	F / >180
13400 South & Bangerter Hwy	Westbound Left	F / 160	Eastbound Right	E / 77
13400 South & Bangerter Hwy	Westbound Through	F / >180	Westbound Left	F / 103
13400 South & Bangerter Hwy	Westbound Right	F / 108	Westbound Through	F / 167

1. Average delay reported in seconds/vehicle

The 95th percentile queue lengths presented in **Table 9** are of the approaches with the longest queue lengths from the 2050 No Build analysis. The largest difference between the Existing and 2050 No Build conditions occur on the northbound and southbound approaches at Bangerter Highway with an average increase of more than 5,000 feet. The northbound queue increases by approximately 7,000 feet to 8,000 feet during the PM peak hour. This ***results in queues backing through the 2700 West interchange***. The southbound approach queue increases by 4,800 feet to 5,300 feet for the PM peak hour, ***which results in queues backing through the 12600 South interchange***. East-west queues on 13400 south would also substantially increase, particularly eastbound at 4050 West in the AM and westbound at Hamilton View Road in the PM. With increased traffic demand and queue lengths, traffic operations are expected to dramatically deteriorate within the study area.

Table 9. Existing and 2050 No Build 95th Percentile Queue Lengths

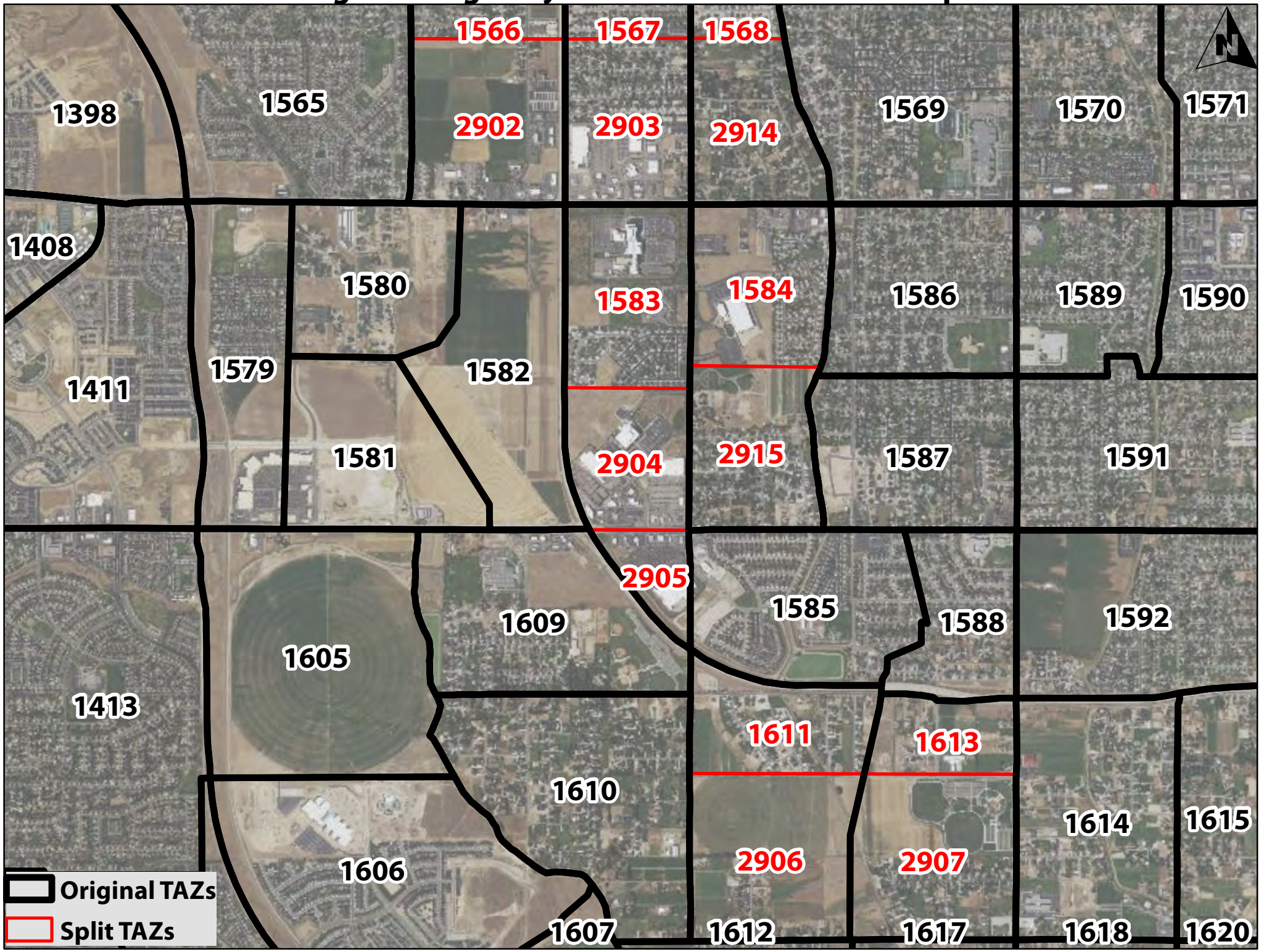
Intersection	Approach	AM Peak Hour			PM Peak Hour		
		Existing (feet)	2050 No Build (feet)	Change 2021-2050 (feet)	Existing (feet)	2050 No Build (feet)	Change 2021-2050 (feet)
13400 South & Bangerter Hwy	Northbound	1,150	7,250	6,100	1,050	8,000	6,950
13400 South & Bangerter Hwy	Southbound	575	5,375	4,800	500	5,375	4,875
13400 South & Bangerter Hwy	Eastbound	875	1,275	400	450	1,275	825
13400 South & Bangerter Hwy	Westbound	175	925	750	450	900	450
13400 South & 4050 West	Eastbound	725	10,025	9,300	325	10,025	9,700
13400 South & Hamilton View Rd	Westbound	125	1,375	1,250	200	2,025	1,825

3 CONCLUSION

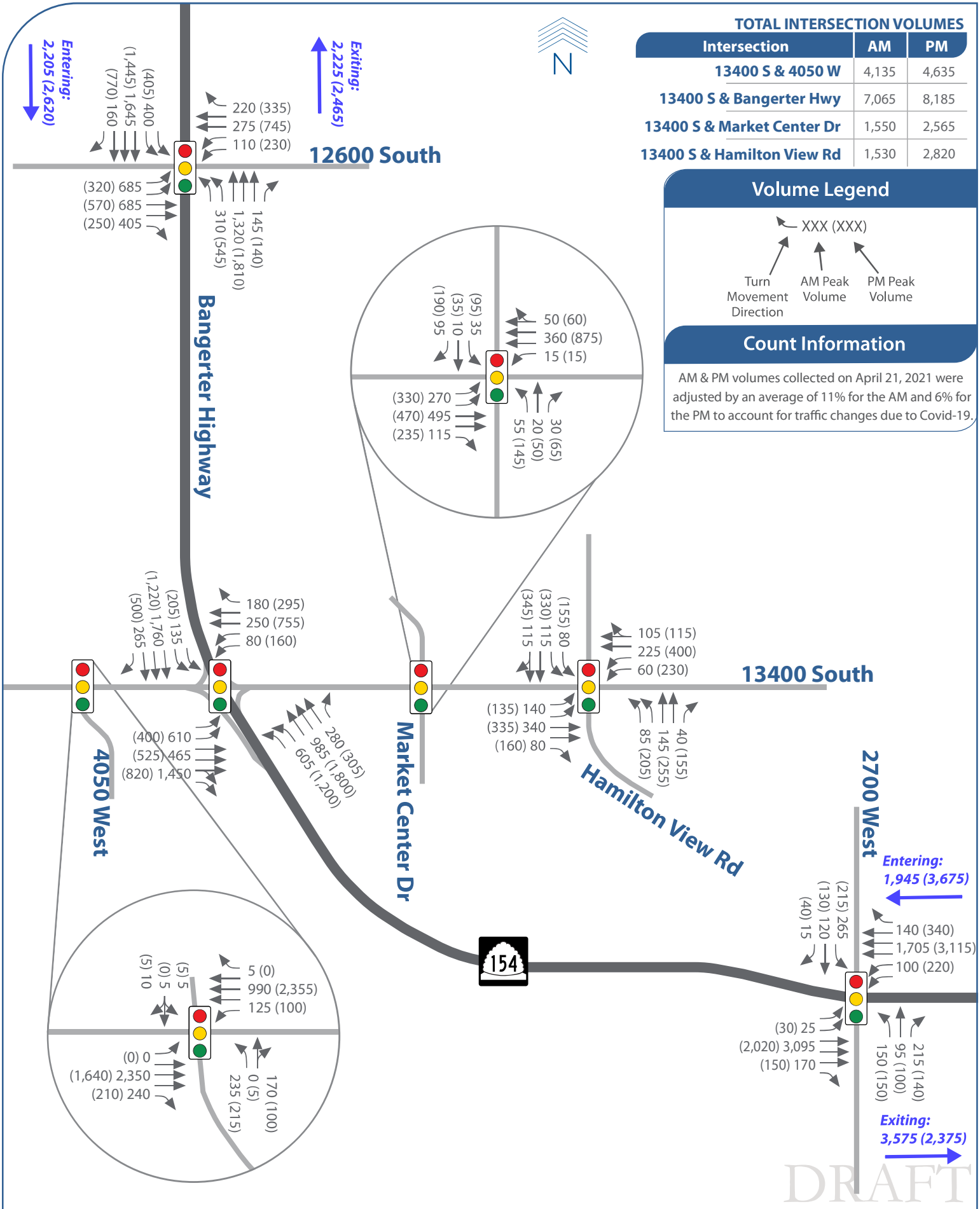
The analysis shows that there are existing movements at the 13400 South and Bangerter Hwy intersection that operate at LOS E and F. With no intersection modifications, delays at that intersection are anticipated to more than triple by 2050, such that eleven out of twelve intersection turning movements would be expected to operate at LOS E or F in both the AM and PM peak hours under 2050 No Build conditions. Queues on both Bangerter Highway and 13400 South would extend through the adjacent interchanges and intersections causing most of the adjacent intersections on 13400 South to fail in both the AM and PM peak hours.

APPENDIX A: TRAFFIC ANALYSIS ZONES

Bangerter Highway & 13400 South Area TAZ Splits

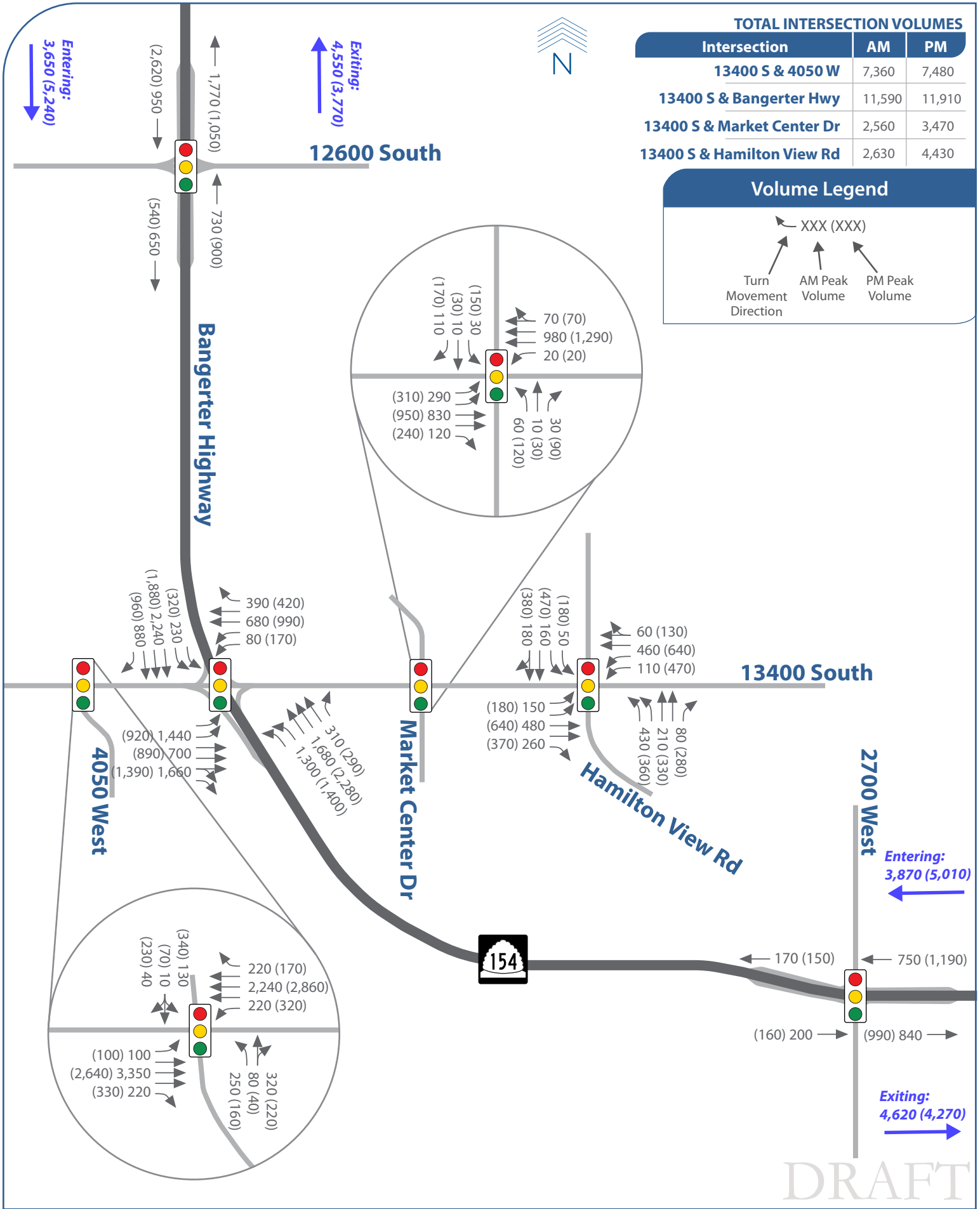


APPENDIX B: PEAK HOUR TRAFFIC VOLUMES



Existing Peak Hour Traffic Volumes

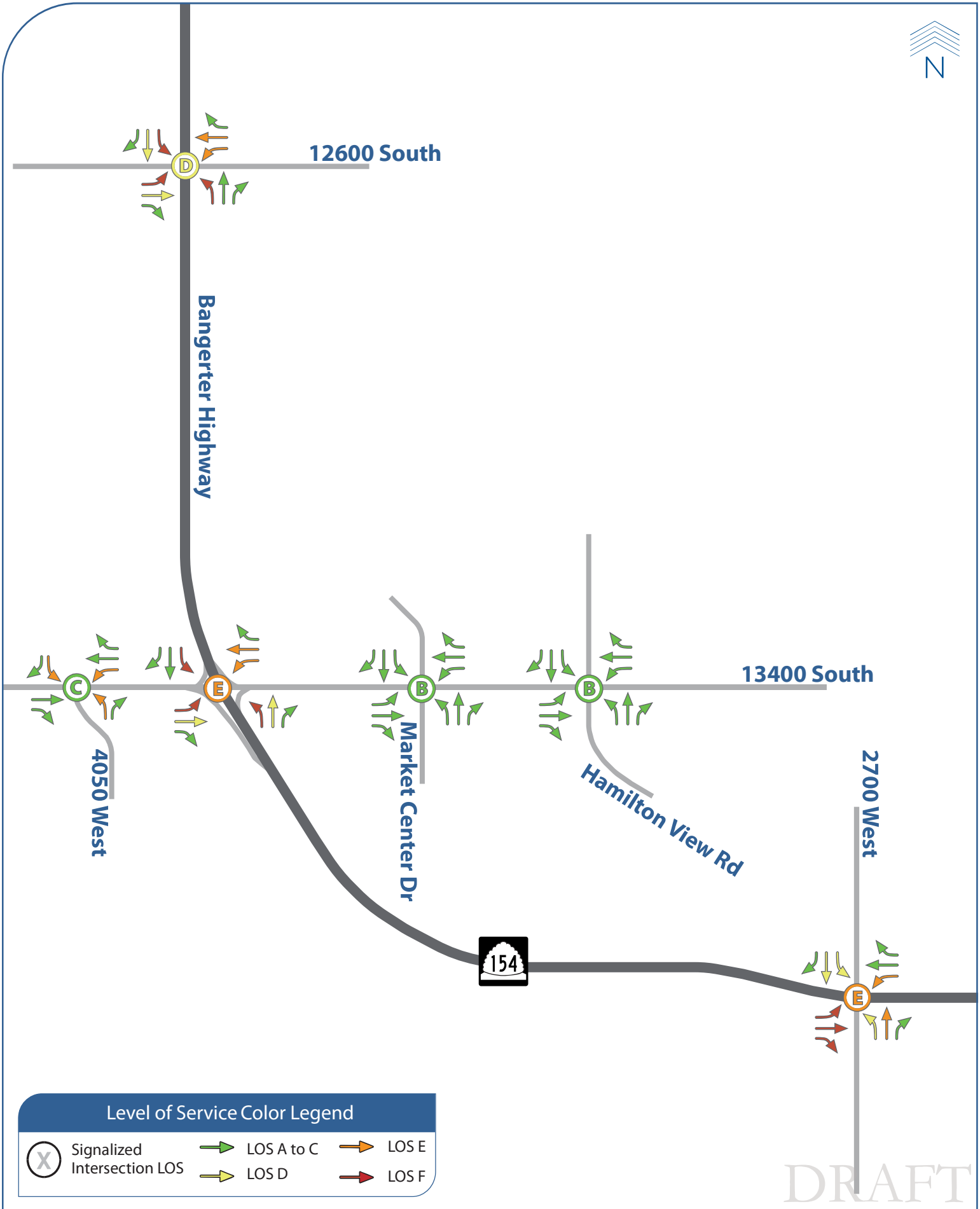
13400 South & Bangerter Highway Environmental Study



2050 No Build Peak Hour Traffic Volumes

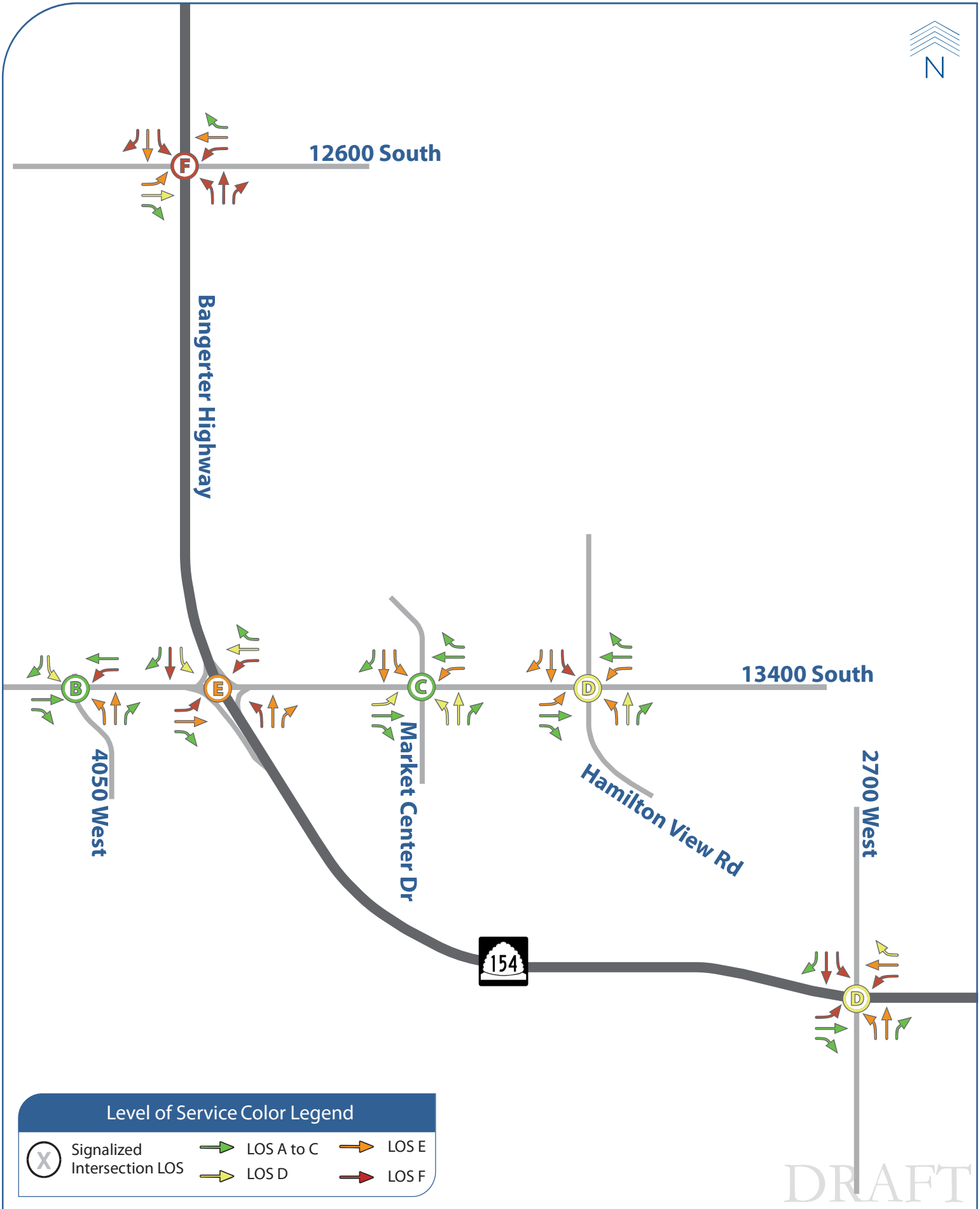
13400 South & Bangerter Highway Environmental Study

APPENDIX C: EXISTING LEVEL OF SERVICE RESULTS



Existing AM Peak Hour Level of Service

13400 South & Bangerter Highway Environmental Study



Existing PM Peak Hour Level of Service

13400 South & Bangerter Highway Environmental Study

Bangerter 12 Interchanges - 13400S

VISSIM Volume, Queue, and Delay Results

Existing AM

LOS Category: Signalized

1: 13400S

Mvmt	Demand	Volume Served	% Served	Queue (ft) Avg / 95th 900-4500		Delay / LOS Analysis Period 900-4500	
NBL	605	555	92%	475	1,150	259	F
NBT	985	984	100%	50	250	38	D
NBR	280	280	100%	50	275	34	C
NB	**1,870**	**1,819**	**97%**			**105**	**F**
SBL	135	140	104%	75	175	157	F
SBT	1,760	1,763	100%	75	575	27	C
SBR	265	269	102%	0	0	7	A
SB	**2,160**	**2,172**	**101%**			**33**	**C**
EBL	610	610	100%	225	875	146	F
EBT	465	456	98%	75	600	36	D
EBR	1,450	1,447	100%	50	550	13	B
EB	**2,525**	**2,513**	**100%**			**50**	**D**
WBL	80	82	103%	25	100	71	E
WBT	250	248	99%	50	175	59	E
WBR	180	178	99%	0	0	2	A
WB	**510**	**508**	**100%**			**41**	**D**
Total	**7,065**	**7,012**	**99%**			**58**	**E**

Node Letter: T VISSIM ID: 134

LOS Category: Signalized

2: 4050W

Mvmt	Demand	Volume Served	% Served	Queue (ft) Avg / 95th 900-4500		Delay / LOS Analysis Period 900-4500	
NBL	235	234	100%	100	350	66	E
NBR	170	170	100%	0	100	11	B
NB	**405**	**404**	**100%**			**43**	**D**
SBL	5	2	40%	0	25	66	E
SBR	10	9	90%	0	0	2	A
SB	**15**	**11**	**73%**			**16**	**B**
EBT	2,350	2,344	100%	150	725	23	C
EBR	240	244	102%	0	100	11	B
EB	**2,590**	**2,588**	**100%**			**22**	**C**
WBL	125	119	95%	50	225	75	E
WBT	990	946	96%	25	225	12	B
WBR	5	5	100%	0	0	2	A
WB	**1,120**	**1,070**	**96%**			**19**	**B**
Total	**4,130**	**4,073**	**99%**			**23**	**C**

Node Letter: TA VISSIM ID: 3200

Existing PM

LOS Category: Signalized

1: 13400S

Mvmt	Demand	Volume Served	% Served	Queue (ft) Avg / 95th 900-4500		Delay / LOS Analysis Period 900-4500	
NBL	1,200	1,192	99%	375	1,050	87	F
NBT	1,800	1,826	101%	275	725	74	E
NBR	305	316	104%	150	675	56	E
NB	**3,305**	**3,334**	**101%**			**77**	**E**
SBL	205	209	102%	25	125	54	D
SBT	1,220	1,224	100%	225	500	85	F
SBR	500	505	101%	0	0	8	A
SB	**1,925**	**1,938**	**101%**			**62**	**E**
EBL	400	397	99%	150	450	167	F
EBT	525	518	99%	100	375	62	E
EBR	820	830	101%	25	250	7	A
EB	**1,745**	**1,745**	**100%**			**60**	**E**
WBL	160	161	101%	50	125	92	F
WBT	755	755	100%	100	450	40	D
WBR	295	298	101%	0	0	3	A
WB	**1,210**	**1,214**	**100%**			**38**	**D**
Total	**8,185**	**8,231**	**101%**			**64**	**E**

Node Letter: T VISSIM ID: 134

LOS Category: Signalized

2: 4050W

Mvmt	Demand	Volume Served	% Served	Queue (ft) Avg / 95th 900-4500		Delay / LOS Analysis Period 900-4500	
NBL	215	212	99%	100	325	69	E
NBT	5	5	100%	0	75	57	E
NBR	100	101	101%	0	125	12	B
NB	**320**	**318**	**99%**			**51**	**D**
SBL	5	3	60%	0	25	47	D
SBR	5	5	100%	0	25	4	A
SB	**10**	**8**	**80%**			**20**	**B**
EBT	1,640	1,642	100%	50	325	14	B
EBR	210	208	99%	0	75	5	A
EB	**1,850**	**1,850**	**100%**			**13**	**B**
WBL	100	101	101%	50	175	93	F
WBT	2,355	2,350	100%	0	50	1	A
WB	**2,455**	**2,451**	**100%**			**5**	**A**
Total	**4,635**	**4,627**	**100%**			**11**	**B**

Node Letter: TA VISSIM ID: 3200

Existing AM

LOS Category: Signalized

3: Market Center

Delay / LOS

Mvmt	Demand	Volume Served	% Served	Queue (ft) Avg / 95th 900-4500		Analysis Period 900-4500	
NBL	55	54	98%	0	75	21	C
NBT	20	19	95%	0	25	21	C
NBR	30	30	100%	0	25	5	A
NB	**105**	**103**	**98%**			**17**	**B**
SBL	35	36	103%	0	50	23	C
SBT	10	10	100%	0	25	22	C
SBR	95	95	100%	0	50	5	A
SB	**140**	**141**	**101%**			**11**	**B**
EBL	270	266	99%	25	125	20	B
EBT	495	496	100%	0	125	6	A
EBR	115	112	97%	0	125	3	A
EB	**880**	**874**	**99%**			**10**	**A**
WBL	15	16	107%	0	25	23	C
WBT	360	358	99%	0	100	11	B
WBR	50	48	96%	25	125	7	A
WB	**425**	**422**	**99%**			**11**	**B**
Total	**1,550**	**1,540**	**99%**			**11**	**B**

Node Letter: TB VISSIM ID: 3300

LOS Category: Signalized

4: Hamilton View

Delay / LOS

Mvmt	Demand	Volume Served	% Served	Queue (ft) Avg / 95th 900-4500		Analysis Period 900-4500	
NBL	85	84	99%	0	50	31	C
NBT	145	145	100%	25	75	26	C
NBR	40	40	100%	0	25	4	A
NB	**270**	**269**	**100%**			**24**	**C**
SBL	80	78	98%	0	50	32	C
SBT	115	117	102%	25	100	27	C
SBR	115	114	99%	25	125	12	B
SB	**310**	**309**	**100%**			**23**	**C**
EBL	140	144	103%	25	100	30	C
EBT	340	339	100%	25	125	14	B
EBR	80	79	99%	0	50	6	A
EB	**560**	**562**	**100%**			**17**	**B**
WBL	60	63	105%	0	75	32	C
WBT	225	224	100%	25	125	17	B
WBR	105	101	96%	25	125	10	A
WB	**390**	**388**	**99%**			**17**	**B**
Total	**1,530**	**1,528**	**100%**			**20**	**B**

Node Letter: TC VISSIM ID: 3400

Existing PM

LOS Category: Signalized

3: Market Center

Delay / LOS

Mvmt	Demand	Volume Served	% Served	Queue (ft) Avg / 95th 900-4500		Analysis Period 900-4500	
NBL	145	148	102%	50	250	55	D
NBT	50	49	98%	0	75	49	D
NBR	65	63	97%	0	50	6	A
NB	**260**	**260**	**100%**			**42**	**D**
SBL	95	97	102%	50	175	68	E
SBT	35	33	94%	0	75	64	E
SBR	190	188	99%	0	75	6	A
SB	**320**	**318**	**99%**			**31**	**C**
EBL	330	333	101%	50	200	50	D
EBT	470	467	99%	25	150	12	B
EBR	235	243	103%	25	150	6	A
EB	**1,035**	**1,043**	**101%**			**23**	**C**
WBL	15	14	93%	0	50	70	E
WBT	875	880	101%	75	275	29	C
WBR	60	61	102%	75	300	26	C
WB	**950**	**955**	**101%**			**29**	**C**
Total	**2,565**	**2,576**	**100%**			**28**	**C**

Node Letter: TB VISSIM ID: 3300

LOS Category: Signalized

4: Hamilton View

Delay / LOS

Mvmt	Demand	Volume Served	% Served	Queue (ft) Avg / 95th 900-4500		Analysis Period 900-4500	
NBL	205	200	98%	50	150	69	E
NBT	255	258	101%	50	150	54	D
NBR	155	154	99%	0	75	6	A
NB	**615**	**612**	**100%**			**47**	**D**
SBL	155	156	101%	50	125	81	F
SBT	330	326	99%	200	600	80	E
SBR	345	350	101%	200	600	64	E
SB	**830**	**832**	**100%**			**74**	**E**
EBL	135	130	96%	25	125	72	E
EBT	335	333	99%	25	125	15	B
EBR	160	164	103%	0	75	6	A
EB	**630**	**627**	**100%**			**25**	**C**
WBL	230	227	99%	50	175	71	E
WBT	400	405	101%	25	175	20	B
WBR	115	114	99%	25	200	16	B
WB	**745**	**746**	**100%**			**35**	**C**
Total	**2,820**	**2,817**	**100%**			**47**	**D**

Node Letter: TC VISSIM ID: 3400

Existing AM

LOS Category: Signalized

5: 12600S

Delay / LOS

Mvmt	Demand	Volume Served	% Served	Queue (ft) Avg / 95th 900-4500		Analysis Period 900-4500	
NBL	310	317	102%	100	225	95	F
NBT	1,320	1,316	100%	50	325	20	B
NBR	145	146	101%	0	100	12	B
NB	**1,775**	**1,779**	**100%**			**33**	**C**
SBL	350	348	99%	100	275	91	F
SBT	1,645	1,649	100%	150	525	42	D
SBR	130	124	95%	0	50	6	A
SB	**2,125**	**2,121**	**100%**			**48**	**D**
EBL	685	681	99%	225	1,000	84	F
EBT	685	684	100%	125	375	51	D
EBR	405	409	101%	50	325	23	C
EB	**1,775**	**1,774**	**100%**			**57**	**E**
WBL	110	106	96%	25	125	73	E
WBT	275	274	100%	50	225	67	E
WBR	220	224	102%	25	125	11	B
WB	**605**	**604**	**100%**			**47**	**D**
Total	**6,280**	**6,278**	**100%**			**46**	**D**

Node Letter: S VISSIM ID: 126

LOS Category: Signalized

6: 2700W

Delay / LOS

Mvmt	Demand	Volume Served	% Served	Queue (ft) Avg / 95th 900-4500		Analysis Period 900-4500	
NBL	150	142	95%	50	200	54	D
NBT	95	91	96%	50	275	63	E
NBR	215	219	102%	50	350	28	C
NB	**460**	**452**	**98%**			**43**	**D**
SBL	265	260	98%	100	400	53	D
SBT	120	119	99%	25	175	55	D
SBR	15	17	**113%**	0	25	10	A
SB	**400**	**396**	**99%**			**52**	**D**
EBL	25	24	96%	0	50	139	F
EBT	3,095	3,012	97%	1,500	3,625	114	F
EBR	170	168	99%	0	100	82	F
EB	**3,290**	**3,204**	**97%**			**113**	**F**
WBL	100	104	104%	25	125	78	E
WBT	1,705	1,697	100%	75	400	20	B
WBR	140	142	101%	0	125	4	A
WB	**1,945**	**1,943**	**100%**			**22**	**C**
Total	**6,095**	**5,995**	**98%**			**74**	**E**

Node Letter: U VISSIM ID: 2700

Existing PM

LOS Category: Signalized

5: 12600S

Delay / LOS

Mvmt	Demand	Volume Served	% Served	Queue (ft) Avg / 95th 900-4500		Analysis Period 900-4500	
NBL	545	497	91%	1,025	3,775	270	F
NBT	1,810	1,741	96%	1,050	3,775	143	F
NBR	140	139	99%	25	125	88	F
NB	**2,495**	**2,377**	**95%**			**166**	**F**
SBL	405	397	98%	225	1,050	148	F
SBT	1,445	1,438	100%	350	1,325	57	E
SBR	770	758	98%	500	1,350	82	F
SB	**2,620**	**2,593**	**99%**			**78**	**E**
EBL	320	313	98%	75	225	67	E
EBT	570	562	99%	100	325	51	D
EBR	250	261	104%	25	150	12	B
EB	**1,140**	**1,136**	**100%**			**47**	**D**
WBL	230	236	103%	75	200	83	F
WBT	745	738	99%	200	700	77	E
WBR	335	337	101%	50	225	23	C
WB	**1,310**	**1,311**	**100%**			**64**	**E**
Total	**7,565**	**7,417**	**98%**			**99**	**F**

Node Letter: S VISSIM ID: 126

LOS Category: Signalized

6: 2700W

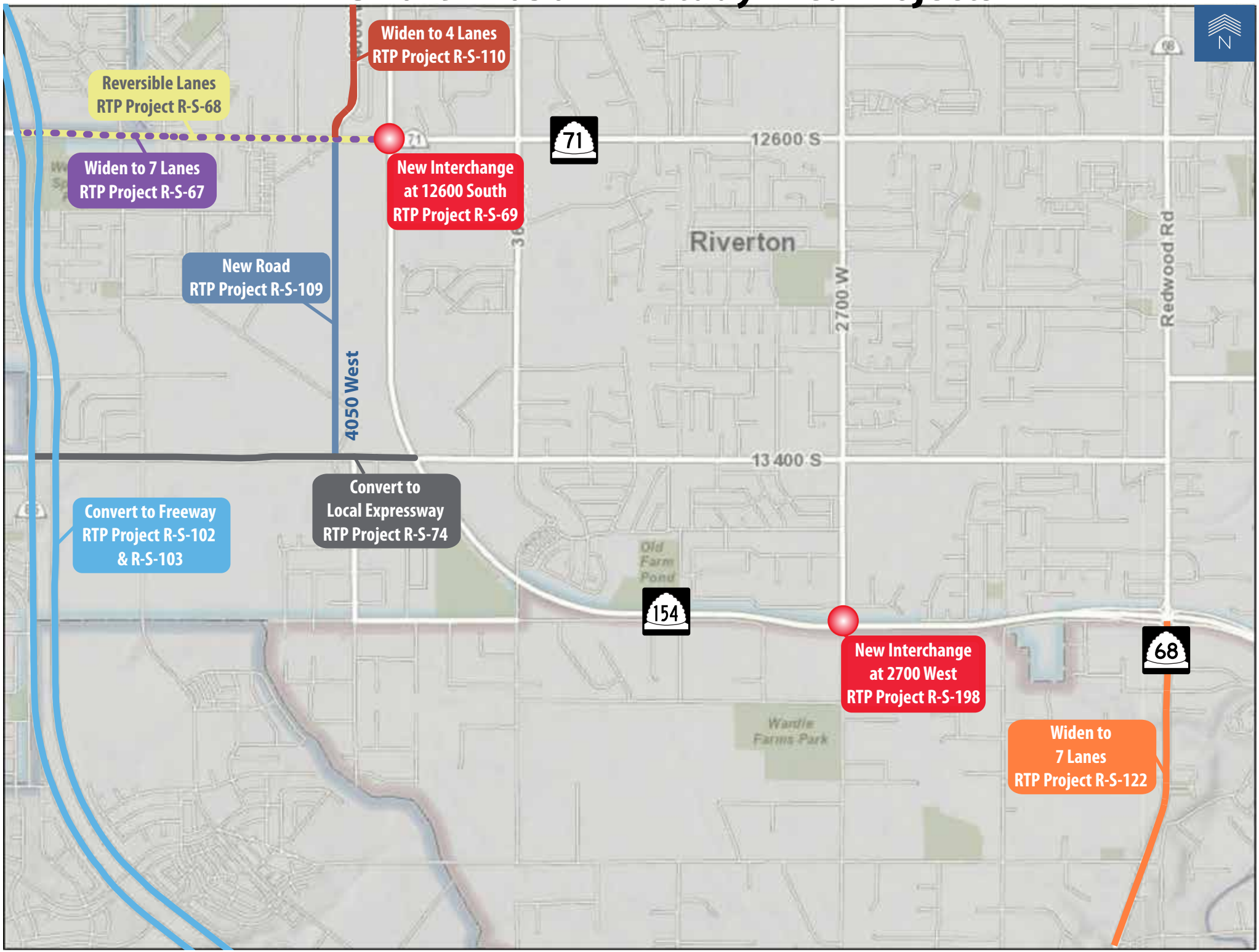
Delay / LOS

Mvmt	Demand	Volume Served	% Served	Queue (ft) Avg / 95th 900-4500		Analysis Period 900-4500	
NBL	150	144	96%	50	225	64	E
NBT	100	97	97%	50	250	76	E
NBR	140	144	103%	25	100	18	B
NB	**390**	**385**	**99%**			**50**	**D**
SBL	215	207	96%	125	600	91	F
SBT	130	131	101%	50	275	88	F
SBR	40	39	98%	0	50	25	C
SB	**385**	**377**	**98%**			**83**	**F**
EBL	30	31	103%	25	50	111	F
EBT	2,020	2,029	100%	100	650	24	C
EBR	150	150	100%	0	75	10	A
EB	**2,200**	**2,210**	**100%**			**24**	**C**
WBL	220	223	101%	50	200	112	F
WBT	3,115	3,163	102%	1,225	3,175	65	E
WBR	340	355	104%	25	175	45	D
WB	**3,675**	**3,741**	**102%**			**66**	**E**
Total	**6,650**	**6,713**	**101%**			**52**	**D**

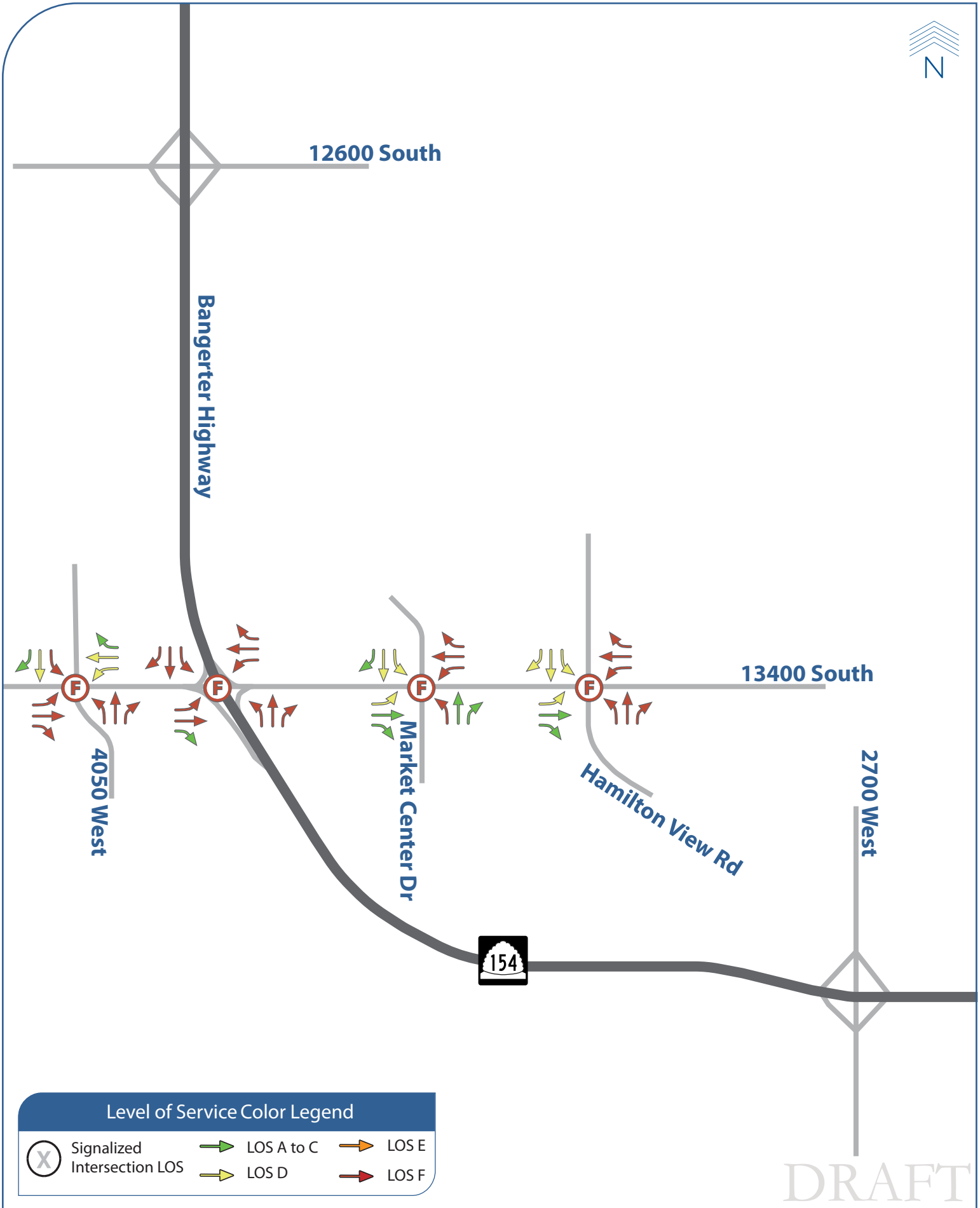
Node Letter: U VISSIM ID: 2700

APPENDIX D: PLANNED TRANSPORTATION PROJECTS

WFRC 2019 -2050 RTP Study Area Projects

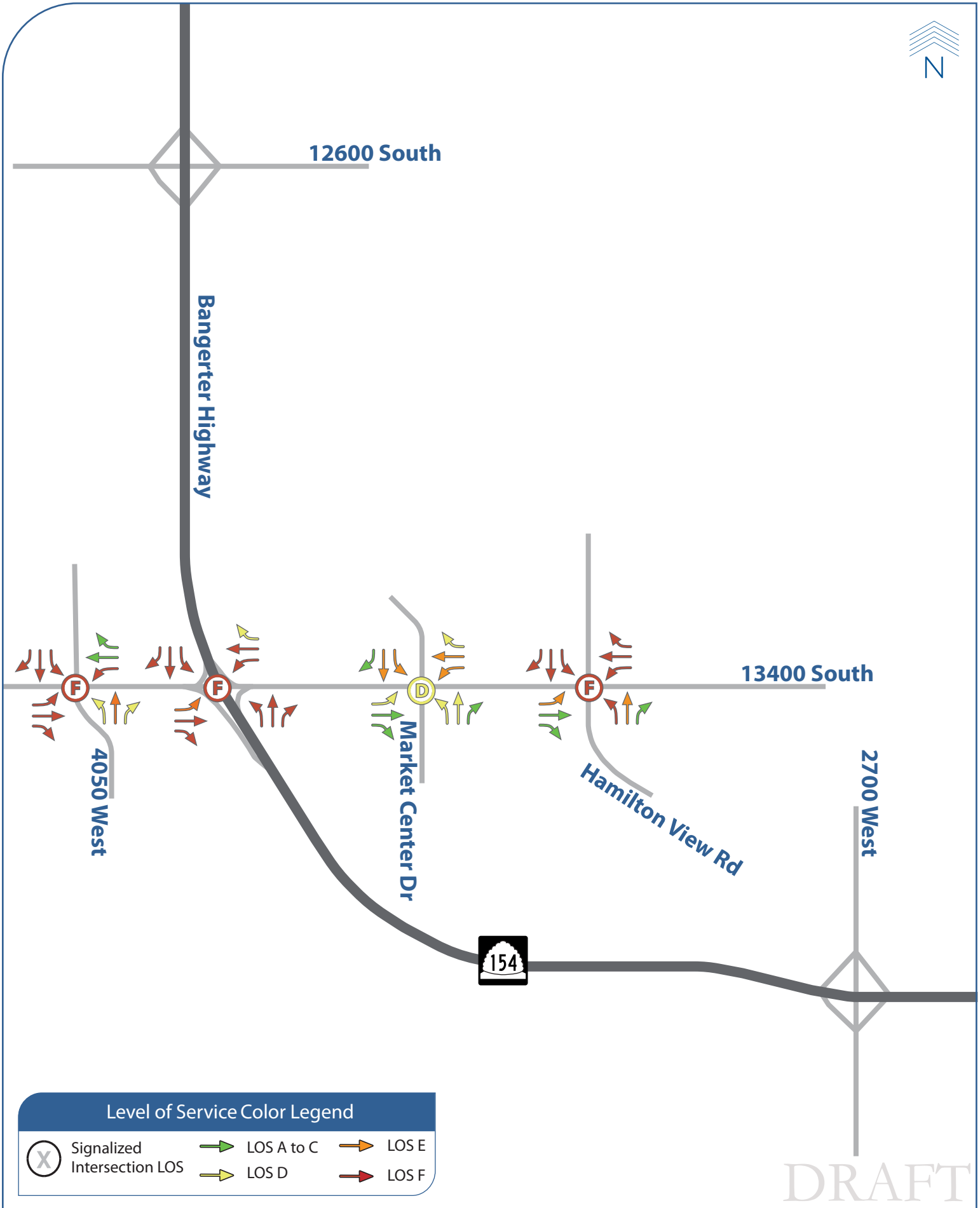


APPENDIX E: 2050 NO BUILD LEVEL OF SERVICE RESULTS



2050 No Build AM Peak Hour Level of Service

13400 South & Bangerter Highway Environmental Study



2050 No Build PM Peak Hour Level of Service

13400 South & Bangerter Highway Environmental Study

Bangerter 12 Interchanges - 13400S

2050NoBldRTP_AM

LOS Category: Signalized

1: 13400S

Delay / LOS

Mvmt	Demand	Volume Served	% Served	Queue (ft) Avg / 95th 900-4500		Analysis Period 900-4500	
NBL	1,300	698	54%	6,175	7,250	1015	F
NBT	1,680	1,043	62%	100	425	516	F
NBR	310	195	63%	50	300	491	F
NB	**3,290**	**1,936**	**59%**			**693**	**F**
SBL	230	189	82%	1,600	4,725	545	F
SBT	2,240	1,939	87%	3,500	5,375	383	F
SBR	880	777	88%	0	0	277	F
SB	**3,350**	**2,905**	**87%**			**366**	**F**
EBL	1,440	774	54%	975	1,275	325	F
EBT	700	385	55%	775	1,275	133	F
EBR	1,660	952	57%	500	1,250	33	C
EB	**3,800**	**2,111**	**56%**			**158**	**F**
WBL	80	66	83%	0	75	160	F
WBT	680	532	78%	775	925	365	F
WBR	390	322	83%	0	0	108	F
WB	**1,150**	**920**	**80%**			**261**	**F**
Total	**11,590**	**7,872**	**68%**			**378**	**F**

Node Letter: T VISSIM ID: 134

LOS Category: Signalized

2: 4050W

Delay / LOS

Mvmt	Demand	Volume Served	% Served	Queue (ft) Avg / 95th 900-4500		Analysis Period 900-4500	
NBL	250	244	98%	650	2,200	169	F
NBT	80	75	94%	825	2,175	180	F
NBR	320	310	97%	850	2,200	161	F
NB	**650**	**629**	**97%**			**167**	**F**
SBL	130	128	98%	75	225	90	F
SBT	10	9	90%	0	25	53	D
SBR	40	41	103%	0	25	6	A
SB	**180**	**178**	**99%**			**69**	**E**
EBL	100	52	52%	25	100	1072	F
EBT	3,350	1,700	51%	8,700	10,025	1061	F
EBR	220	110	50%	0	50	1016	F
EB	**3,670**	**1,862**	**51%**			**1059**	**F**
WBL	220	153	70%	50	250	53	D
WBT	2,420	1,700	70%	150	550	36	D
WBR	220	155	70%	25	150	33	C
WB	**2,860**	**2,008**	**70%**			**37**	**D**
Total	**7,360**	**4,677**	**64%**			**462**	**F**

Node Letter: TA VISSIM ID: 3200

2050NoBldRTP_PM

LOS Category: Signalized

1: 13400S

Delay / LOS

Mvmt	Demand	Volume Served	% Served	Queue (ft) Avg / 95th 900-4500		Analysis Period 900-4500	
NBL	1,400	1,202	86%	4,475	7,175	350	F
NBT	2,280	2,027	89%	4,850	8,000	291	F
NBR	290	263	91%	4,675	7,975	268	F
NB	**3,970**	**3,492**	**88%**			**310**	**F**
SBL	320	225	70%	50	175	528	F
SBT	1,880	1,351	72%	4,225	5,375	690	F
SBR	960	673	70%	250	3,050	513	F
SB	**3,160**	**2,249**	**71%**			**621**	**F**
EBL	920	421	46%	1,075	1,250	567	F
EBT	890	445	50%	1,075	1,275	241	F
EBR	1,390	723	52%	500	1,200	77	E
EB	**3,200**	**1,589**	**50%**			**253**	**F**
WBL	170	150	88%	25	125	103	F
WBT	990	834	84%	575	900	167	F
WBR	420	367	87%	0	0	37	D
WB	**1,580**	**1,351**	**86%**			**125**	**F**
Total	**11,910**	**8,681**	**73%**			**351**	**F**

Node Letter: T VISSIM ID: 134

LOS Category: Signalized

2: 4050W

Delay / LOS

Mvmt	Demand	Volume Served	% Served	Queue (ft) Avg / 95th 900-4500		Analysis Period 900-4500	
NBL	160	160	100%	50	225	50	D
NBT	40	38	95%	50	325	59	E
NBR	220	220	100%	75	350	49	D
NB	**420**	**418**	**100%**			**50**	**D**
SBL	340	111	33%	1,350	1,425	917	F
SBT	70	25	36%	50	100	752	F
SBR	230	79	34%	150	1,450	689	F
SB	**640**	**215**	**34%**			**814**	**F**
EBL	100	49	49%	25	125	1034	F
EBT	2,640	1,307	50%	7,825	10,025	1047	F
EBR	330	160	48%	0	75	992	F
EB	**3,070**	**1,516**	**49%**			**1041**	**F**
WBL	320	251	78%	550	2,025	210	F
WBT	2,860	2,317	81%	75	450	12	B
WBR	170	138	81%	0	50	10	A
WB	**3,350**	**2,706**	**81%**			**30**	**C**
Total	**7,480**	**4,855**	**65%**			**382**	**F**

Node Letter: TA VISSIM ID: 3200

2050NoBldRTP_AM

LOS Category: Signalized

3: Market Center

Delay / LOS

Mvmt	Demand	Volume Served	% Served	Queue (ft) Avg / 95th 900-4500		Analysis Period 900-4500	
NBL	60	56	93%	50	225	161	F
NBT	10	10	100%	0	25	29	C
NBR	30	30	100%	0	25	13	B
NB	**100**	**96**	**96%**			**101**	**F**
SBL	30	28	93%	0	50	36	D
SBT	10	11	110%	0	25	37	D
SBR	110	108	98%	0	75	11	B
SB	**150**	**147**	**98%**			**18**	**B**
EBL	290	174	60%	25	125	39	D
EBT	830	517	62%	25	175	10	A
EBR	120	76	63%	25	200	4	A
EB	**1,240**	**767**	**62%**			**16**	**B**
WBL	20	18	90%	0	50	109	F
WBT	980	797	81%	400	650	186	F
WBR	70	53	76%	425	650	137	F
WB	**1,070**	**868**	**81%**			**182**	**F**
Total	**2,560**	**1,878**	**73%**			**97**	**F**

Node Letter: TB VISSIM ID: 3300

LOS Category: Signalized

4: Hamilton View

Delay / LOS

Mvmt	Demand	Volume Served	% Served	Queue (ft) Avg / 95th 900-4500		Analysis Period 900-4500	
NBL	430	335	78%	500	1,150	247	F
NBT	210	189	90%	25	125	114	F
NBR	80	66	83%	0	50	97	F
NB	**720**	**590**	**82%**			**188**	**F**
SBL	50	50	100%	0	50	50	D
SBT	160	159	99%	50	250	40	D
SBR	180	178	99%	50	250	48	D
SB	**390**	**387**	**99%**			**45**	**D**
EBL	150	90	60%	25	75	51	D
EBT	480	316	66%	25	175	27	C
EBR	260	166	64%	0	125	9	A
EB	**890**	**572**	**64%**			**26**	**C**
WBL	110	104	95%	25	125	98	F
WBT	460	416	90%	350	1,350	157	F
WBR	60	54	90%	350	1,375	148	F
WB	**630**	**574**	**91%**			**146**	**F**
Total	**2,630**	**2,123**	**81%**			**107**	**F**

Node Letter: TC VISSIM ID: 3400

2050NoBldRTP_PM

LOS Category: Signalized

3: Market Center

Delay / LOS

Mvmt	Demand	Volume Served	% Served	Queue (ft) Avg / 95th 900-4500		Analysis Period 900-4500	
NBL	120	122	102%	25	175	48	D
NBT	30	29	97%	0	50	48	D
NBR	90	87	97%	0	50	5	A
NB	**240**	**238**	**99%**			**33**	**C**
SBL	150	152	101%	50	250	68	E
SBT	30	30	100%	0	75	61	E
SBR	170	166	98%	0	75	6	A
SB	**350**	**348**	**99%**			**38**	**D**
EBL	310	199	64%	25	125	40	D
EBT	950	583	61%	25	125	10	A
EBR	240	156	65%	25	150	5	A
EB	**1,500**	**938**	**63%**			**15**	**B**
WBL	20	18	90%	0	50	80	E
WBT	1,290	1,106	86%	200	625	71	E
WBR	70	58	83%	200	625	51	D
WB	**1,380**	**1,182**	**86%**			**70**	**E**
Total	**3,470**	**2,706**	**78%**			**44**	**D**

Node Letter: TB VISSIM ID: 3300

LOS Category: Signalized

4: Hamilton View

Delay / LOS

Mvmt	Demand	Volume Served	% Served	Queue (ft) Avg / 95th 900-4500		Analysis Period 900-4500	
NBL	360	348	97%	275	850	169	F
NBT	330	333	101%	100	800	63	E
NBR	280	268	96%	25	150	16	B
NB	**970**	**949**	**98%**			**89**	**F**
SBL	180	142	79%	50	125	405	F
SBT	470	367	78%	1,425	1,900	430	F
SBR	380	299	79%	1,450	1,900	415	F
SB	**1,030**	**808**	**78%**			**420**	**F**
EBL	180	126	70%	25	125	69	E
EBT	640	438	68%	25	150	20	B
EBR	370	259	70%	0	125	9	A
EB	**1,190**	**823**	**69%**			**24**	**C**
WBL	470	380	81%	1,850	3,750	486	F
WBT	640	553	86%	350	2,825	272	F
WBR	130	105	81%	350	2,825	273	F
WB	**1,240**	**1,038**	**84%**			**351**	**F**
Total	**4,430**	**3,618**	**82%**			**223**	**F**

Node Letter: TC VISSIM ID: 3400



Appendix B: Traffic and Design

Bangerter Highway & 13400 South Future Build Traffic Analysis

MEMORANDUM

To: UDOT Region Two & Environmental

From: Avenue Consultants

Date: January 10, 2022

Subject: Bangerter Highway & 13400 South Future Build Traffic Analysis

The Utah Department of Transportation (UDOT) is performing an environmental study for a potential new interchange on Bangerter Highway at the existing 13400 South at-grade intersection. This memorandum summarizes the traffic evaluation for 2050 and 2030 Build conditions within the study area. For this analysis, the study area consists of the Bangerter Highway corridor from 12600 South to 2700 West and the 13400 South corridor from 4050 West to Hamilton View Road (3600 West), as illustrated in **Figure 1**.



Figure 1: Bangerter Highway and Adjacent Intersections Study Area

1 ANALYSIS METHODOLOGY

The analysis described in this memorandum utilized project traffic data, Vissim traffic operations software and the Wasatch Front Regional Council (WFRC) / Mountainland Associated of Governments (MAG) travel demand model for year 2050 traffic forecasts. This section describes how each of these tools were implemented for this project.

1.1 Travel Demand Modeling

The WFRC/MAG travel demand model (TDM) is a tool used to predict future travel and traffic volumes for the Wasatch Front area. The TDM is jointly owned and maintained by the WFRC and the MAG, which are the Metropolitan Planning Organizations for the Wasatch Front. They produce the Regional Transportation Plan,

which is the plan for the development of the future transportation system. The RTP includes a list of projects that are planned to meet future transportation needs over a 25 to 30-year horizon. WFRC is responsible for Weber, Davis, and Salt Lake Counties and MAG for Utah County. Version 8.3.1 of the TDM was used for this study.

The travel demand model has two primary inputs: land use data and transportation system data. The land use data consists of residential and employment data for the entire region. This data is prepared in geographic blocks called Traffic Analysis Zones (TAZs). The travel model inputs are prepared for a base year, which in this case was 2019, and for a future year, which in this case was 2050. A base year of 2019 was used because both travel model socioeconomic inputs and published traffic volume data are available for that year. In travel modeling, the base year always lags the current year by a few years because of the need to have land use input and calibration data.

Additional details on how the travel model was used for this project can be found in the **Bangerter Highway & 13400 South Existing and 2050 No Build Traffic Analysis** memo.

1.2 Traffic Operations Analysis

The Vissim software was selected for this study because it allows for the evaluation of freeways, closely spaced intersections, and the interaction between the two facilities. Vissim allows for driving behaviors to be modified, can collect travel time data for user-specified segments and can measure queue lengths at study intersections, which collectively are used to calibrate the model to observed conditions.

The intersections within the study area were modeled according to assumed future intersection and roadway geometry based on the RTP and the various build alternatives. The study area was modeled as a network; however, the analysis was completed for each intersection independently.

1.2.1 Traffic Volumes

The future AM and PM peak hour volumes were developed using principles described in the National Highway Cooperative Research Program (NCHRP) Report 255 document. The forecast peak period intersection volumes were developed from the existing peak hour traffic volumes and data from the WFRC/MAG travel demand model. The travel model was run for the base year (2019) and for the future years (2030 & 2050). The difference between base year and future year models was used to estimate the traffic growth for each intersection leg, which was then applied to the existing intersection leg volumes. The future individual movement volumes were then balanced to ensure the correct number of inbound and outbound vehicles on each leg of the intersection. Included in **Appendix A** are figures presenting the resulting 2050 Build traffic volumes used in for different stages of traffic analysis. Details on existing and 2050 no build traffic volumes can be found in the **Bangerter Highway & 13400 South Existing and 2050 No Build Traffic Analysis** memo.

1.2.2 Measures of Effectiveness

The operational analysis is based upon Vissim output correlated to the *Highway Capacity Manual (HCM) 6th Edition* methodologies, which describes how transportation system performance can be measured and ranked by level of service (LOS). LOS is measured quantitatively and reported on a scale from A to F, with A representing the best performance and F the worst.

The primary measure of effectiveness for this study was intersection performance. For intersections, LOS is based on average vehicle delay measured in seconds per vehicle. Delay and LOS are determined for each turning movement, approach, and the overall intersection. For signalized intersections, the overall intersection LOS is most commonly reported. **Table 1** provides details regarding LOS criteria thresholds for signalized intersections.

Table 1. Intersection Level of Service Criteria

Level of Service	Traffic Conditions	Average Delay (seconds/vehicle)
A	Free Flow Operations / Insignificant Delay	0 ≤ 10
B	Smooth Operations / Short Delays	> 10 and ≤ 20
C	Stable Operations / Acceptable Delays	> 20 and ≤ 35
D	Approaching Unstable Operations / Tolerable Delays	> 35 and ≤ 55
E	Unstable Operations / Significant Delays Begin	> 55 and ≤ 80
F	Very Poor Operations / Excessive Delays Occur	> 80

Source: Highway Capacity Manual 6th Edition, *TRB National Research Council, Washington D.C*

Another important measure of effectiveness is 95th percentile queue length for each turning movement and is the vehicle queue distance that will only be exceeded five percent of the time during the analysis period and helps identify issues such as queuing between intersections and queues that exceed their turning movement storage.

2 ALTERNATIVES ANALYSIS

For the build alternatives analysis at 13400 South, two interchange alternatives were proposed and evaluated: a Tight Diamond Interchange and a Single Point Urban Interchange (SPUI). Both interchange alternatives have the same cross-section on 13400 South tying into the interchange. At this stage of the study, it was assumed that all the left turns have two lanes, and all the right turns have one lane, except for the eastbound right which was assumed to have two lanes.

2.1 Traffic Volumes Refinement

Over the course of the study, four volume sets were developed for 2050 conditions. The first three were based on evolving assumptions regarding the background transportation network, namely regarding 12600 South and 13400 South between Mountain View Corridor and Bangerter Highway. The fourth volume set was based on correcting an error in the RTP roadway network that affected volumes at the 13400 South interchange.

At the beginning of the study, the assumptions for 12600 South and 13400 South were based on the recently completed Southwest Salt Lake County Transportation Analysis and Solutions Development study, which recommended system-to-system connection on 12600 South between Mountain View Corridor and Bangerter Highway, meaning direct ramps between the two freeway facilities with no stops required. This volume set had the highest volumes at 12600 South and lowest volumes at 13400 South.

As the study progressed, there was some concern that a system-to-system connection might be too speculative. Thus, a second volume set was developed based on the assumption that both 12600 South and 13400 South would be seven lane principal arterials. This volume set had the most balanced volumes between 12600 South and 13400 South.

The study team then decided that the study should use the RTP assumptions since they are the most defensible and conservative regarding volumes at 13400 South. The RTP assumes that 12600 South will be a seven-lane facility with reversible lanes between Mountain View Corridor and Bangerter Highway so that there would be four travel lanes in the peak direction and two travel lanes in the off-peak direction. The RTP network in the travel assumes that 13400 South would have a high-speed limited-access expressway adjacent to a minor arterial access road between Mountain View Corridor and Bangerter Highway. Due to the expressway lanes, this

volume set has lower volumes at 12600 South and higher at 13400 South than the first two volume sets, which is why it is the most conservative regarding volumes at 13400 South and Bangerter Highway.

Near the end of the environmental study, an error in the background RTP roadway assumptions was discovered. The RTP network included a roadway connection on 14400 South between Mountain View Corridor in Herriman and 2700 West in Bluffdale. However, this connection is not actually in the RTP. Removing this connection increased volumes on the west side of the 13400 South interchange and slightly decreased volumes on the east side of the interchange. This volume set was used for a volume sensitivity test and had the highest volumes at 13400 South of any of the volume sets.

The estimated 2050 peak hour volumes at 13400 South and Bangerter Highway for the three volume sets are presented in **Table 2**.

Table 2. 2050 Peak Hour Volumes for 13400 South and Bangerter Highway

Scenario	Northbound		Southbound		Eastbound			Westbound			Total
	Left	Right	Left	Right	Left	Thru	Right	Left	Thru	Right	
	2050 AM Peak Hour										
Volume Set 1	760	470	250	370	700	500	1,480	100	270	320	5,220
Volume Set 2	900	360	290	660	1,320	540	1,270	90	380	440	6,250
Volume Set 3	1,270	330	240	850	1,320	600	1,530	80	510	360	7,090
Volume Set 4	1,430	280	210	980	1,430	550	1,690	60	470	280	7,380
	2050 PM Peak Hour										
Volume Set 1	1,220	440	420	580	450	540	930	270	765	490	6,105
Volume Set 2	1,280	350	490	1,100	730	680	1,090	190	780	470	7,160
Volume Set 3	1,410	300	400	1,150	920	740	1,350	170	820	440	7,700
Volume Set 4	1,490	290	270	1,170	970	760	1,490	160	780	400	7,880

2.2 Interchange Analysis

Two interchange alternatives were analyzed, a tight diamond and a SPUI. The analysis results presented in this section include intersection delay, LOS, travel times, and 95th percentile queue lengths. The 2050 No Build alternative was used as a baseline against which to compare the build alternatives. Since this analysis was performed at the beginning of the project, **Volume Set 1** was used. **Table 3** presents the level of service (LOS) and delay in seconds per vehicle for the 2050 AM and PM peak hours for the 2050 No Build, Tight Diamond, and SPUI alternatives.

Table 3. 2050 No Build and Build Intersection Delay and Level of Service Comparison

Location	2050 AM Peak Hour			2050 PM Peak Hour		
	No Build[1]	Diamond[1]	SPUI[1]	No Build[1]	Diamond[1]	SPUI[1]
13400 South & 4050 West	F / >180	C / 35	D / 36	F / >180	C / 33	C / 28
13400 South & Bangerter Hwy	F / >180	D / 43	C / 32	F / >180	E / 62	C / 35
13400 South & Market Center Dr	F / 97	B / 12	B / 11	D / 44	C / 24	C / 23
13400 South & Hamilton View Rd	F / 107	C / 23	C / 24	F / >180	D / 52	D / 53

1. Average delay reported in seconds/vehicle

Comparing the delay per vehicle shows substantial differences between alternatives. Although both interchange alternatives show improvement compared to the No Build alternative, the SPUI alternative performs better than the Tight Diamond alternative, particularly during the 2050 PM peak hour when the SPUI would operate at LOS C, while the tight diamond would be at LOS E. The adjacent intersections on 13400 South generally perform about the same between the two alternatives with the SPUI alternative being a little better at 4050 West in the PM.

The 95th percentile queue lengths presented in **Table 4** are of approaches having notable queues with the longest queue lengths from the 2050 No Build analysis with the comparable 95th percentile queues of the proposed 2050 Tight Diamond and SPUI alternatives. Both alternatives generally reduce the 95th percentile queues associated with the No Build. In particular, the queue for the northbound off-ramp at 13400 South is expected to decrease by over 5,000 feet and the queue for the eastbound approach at 4050 West is expected to decrease by over 9,000 feet in the build alternatives. Comparing the 95th percentile queues between the build alternatives show relatively smaller queues for SPUI option in general. The most significant decrease is for northbound off-ramp during both AM and PM peak hour. Detailed results for these analyses can be found in **Appendix B**.

Table 4. 2050 No Build and Build Intersection 95th Percentile Queue Lengths Comparison

Intersection	Approach	2050 AM Peak Hour			2050 PM Hour		
		No Build (feet)	Diamond (feet)	SPUI (feet)	No Build (feet)	Diamond (feet)	SPUI (feet)
13400 South & Bangerter Hwy	Northbound	7,250	1,425	525	8,000	1,125	625
13400 South & Bangerter Hwy	Southbound	5,375	175	175	5,375	550	200
13400 South & Bangerter Hwy	Eastbound	1,275	350	425	1,275	1,025	375
13400 South & Bangerter Hwy	Westbound	925	200	150	900	675	375
13400 South & 4050 West	Eastbound	10,025	725	825	10,025	400	400
13400 South & Hamilton View Rd	Westbound	1,375	450	725	2,025	725	425

Based on its better traffic performance, the SPUI was selected as the preferred alternative and advanced for further analysis.

3 ALTERNATIVE REFINEMENT

After the selection of the SPUI as the preferred alternative, the design team began preparing conceptual interchange designs for different options to minimize impacts and reduce costs. The following sections present traffic analyses for different lane configurations at and approaching the SPUI and recommended turn pocket storage lengths to accommodate the anticipated 2050 demand.

3.1 Base SPUI Scenario

This scenario is same SPUI interchange concept assumed for the interchange alternative analysis with two east-west through lanes, dual left turn lanes and single right turn lanes for all approaches, except for the eastbound right, which would have two lanes. The difference is that **Volume Set 2** was used for this scenario, which increases the estimated 2050 peak hour interchange volumes by 20% for the AM and 17% for the PM with most of the increase coming on the west side of the interchange. With the increased volumes, the performance of the interchange deteriorates, as seen in **Table 5** which presents the level of service (LOS) and vehicle delay for the 2050 AM and PM peak hours for the Base SPUI configuration, where the SPUI would operate at LOS E in AM

peak hour. The table also shows that the 4050 West intersection would operate unacceptably at LOS E and F in the peak hours, which would largely be due to issues associated with the interchange causing queuing through the 4050 West intersection.

Table 5. 2050 SPUI Base Scenario Intersection Delay and Level of Service

Location	2050 AM Peak Hour[1]	2050 PM Peak Hour[1]
13400 South & 4050 West	F / 129	E / 56
13400 South & Bangerter Hwy	E / 58	D / 39
13400 South & Market Center Dr	B / 12	C / 27
13400 South & Hamilton View Rd	C / 26	E / 58
1. Average delay reported in seconds/vehicle		

The 95th percentile queue lengths presented in **Table 6** are of approaches having notable queues for the base SPUI configuration. It shows that during both the 2050 AM and PM peak hours, the eastbound queue at the SPUI would back up through 4050 West intersection where the eastbound queues would extend another 2,200 to 4,400 feet. During AM peak hour, the northbound off-ramp queue would also be substantial, occasionally back up onto mainline Bangerter Highway. Detailed results for this scenario are in **Appendix C**.

Table 6. 2050 Base SPUI 95th Percentile Queue Lengths

Intersection	Approach	2050 AM Peak Hour (feet)	2050 PM Peak Hour (feet)
13400 South & Bangerter Hwy	Northbound	1,450	850
13400 South & Bangerter Hwy	Southbound	175	250
13400 South & Bangerter Hwy	Eastbound	1,275	1,100
13400 South & Bangerter Hwy	Westbound	250	425
13400 South & 4050 West	Eastbound	4,400	2,200
13400 South & Hamilton View Rd	Westbound	425	1,275

3.2 Additional Lanes Scenario

Adjustments were made to the Base SPUI scenario to better to accommodate the high traffic volumes and to mitigate the delay and long queues at 13400 South & Bangerter Highway. The interchange modifications include:

1. Adding an additional northbound left turn lane so that there would be triple lefts
2. Adding an additional southbound right turn lane so that there would be dual rights
3. Reducing the eastbound right turn movement to have one free lane as opposed to two lanes

A traffic analysis was performed for the Additional Lanes scenario and the results compared against the Base SPUI scenario. **Table 7** presents the level of service (LOS) and delay in seconds per vehicle for the AM and PM peak hours for both scenarios. With the additional lanes configuration, the 13400 South interchange operates at LOS D during the AM and PM peak hours, whereas for base SPUI it was at LOS E during the AM peak hour. Additional benefits are realized at 4050 West, where LOS improves from LOS F to a LOS E during AM and from LOS E to a LOS D with the additional lanes.

Table 7. 2050 Additional Lanes Scenario Intersection Delay and Level of Service Comparison

Location	2050 AM Peak Hour		2050 PM Peak Hour	
	Base SPUI	Additional Lanes	Base SPUI	Additional Lanes
13400 South & 4050 West	F / 129	E / 66	E / 56	D / 38
13400 South & Bangerter Hwy	E / 58	D / 39	D / 39	D / 36
13400 South & Market Center Dr	B / 12	B / 12	C / 27	C / 26
13400 South & Hamilton View Rd	C / 26	C / 26	E / 58	E / 57

The 95th percentile queue lengths shown in **Table 8** are of approaches having notable queues for the two scenarios. Queues for all the approaches presented go down substantial in the Additional Lane scenario. Detailed results for the comparing configurations are attached in **Appendix C**.

Table 8. 2050 Additional Lanes Scenario 95th Percentile Queue Lengths Comparison

Intersection	Approach	2050 AM Peak Hour		2050 PM Peak Hour	
		Base SPUI	Additional Lanes	Base SPUI	Additional Lanes
13400 South & Bangerter Hwy	Northbound	1,450	400	850	425
13400 South & Bangerter Hwy	Southbound	175	200	250	550
13400 South & Bangerter Hwy	Eastbound	1,275	850	1,100	450
13400 South & Bangerter Hwy	Westbound	250	250	425	450
13400 South & 4050 West	Eastbound	4,400	1,125	2,200	925
13400 South & Hamilton View Rd	Westbound	425	325	1,275	1,000

3.3 Eastbound Choice Lane Scenario

While the Additional Lanes scenario generally worked well, there was some concern with the lane utilization of eastbound vehicles approaching the interchange in the 2050 AM peak hour. With an eastbound volume of over 3,100 vehicles, it is very desirable to have the volume in each lane as close to equal as possible. However, at Bangerter Highway there are about 1,300 vehicles turning left and about the same number turning right, but only 540 going straight. This means that most drivers will want to be in the left or right lane, leaving the middle lane under-utilized. This scenario addresses that imbalance by making the left lane a left turn trap lane and the middle lane a choice lane from which vehicles can either enter the rightmost of the left turn lanes or continue straight. By allowing eastbound vehicles approaching the interchange that desire to turn left to use either the left or middle lane, the volumes in those two lanes become more evenly balanced, thereby reducing delay. This configuration will not require any additional roadway with, but rather is a change in the pavement markings.

A traffic analysis was performed for the Eastbound Choice Lane scenario and compared against the Additional Lanes scenario. **Table 9** presents the level of service (LOS) and delay in seconds per vehicle for the AM and PM peak hours for both scenarios. Overall, the delay and LOS remains the same for 13400 South interchange. The benefit is observed at 4050 West where the delay goes down from 66 sec/veh to 59 sec/veh for AM. This delay reduction is due to better lane utilization between left and through traffic on the eastbound approach at 4050 West.

Table 9. 2050 Eastbound Choice Lane Scenario Intersection Delay and Level of Service Comparison

Location	2050 AM Peak Hour		2050 PM Peak Hour	
	Additional Lanes	Eastbound Choice Lane	Additional Lanes	Eastbound Choice Lane
13400 South & 4050 West	E / 66	E / 59	D / 38	D / 38
13400 South & Bangerter Hwy	D / 39	D / 39	D / 36	D / 36
13400 South & Market Center Dr	B / 12	B / 12	C / 26	C / 26
13400 South & Hamilton View Rd	C / 26	C / 26	E / 57	E / 57

The 95th percentile queue lengths presented in **Table 10** are of approaches having notable queues for the base configurations. Queue lengths between the two configurations remain roughly the same.

Table 10. 2050 Eastbound Choice Lane Scenario 95th Percentile Queue Lengths Comparison

Intersection	Approach	2050 AM Peak Hour		2050 PM Peak Hour	
		Additional Lanes	Eastbound Choice Lane	Additional Lanes	Eastbound Choice Lane
13400 South & Bangerter Hwy	Northbound	400	400	425	425
13400 South & Bangerter Hwy	Southbound	200	200	550	475
13400 South & Bangerter Hwy	Eastbound	850	750	450	450
13400 South & Bangerter Hwy	Westbound	250	275	450	425
13400 South & 4050 West	Eastbound	1,125	1,250	925	900
13400 South & Hamilton View Rd	Westbound	325	325	1,000	1,000

Based on the results, the delay performance of 13400 South interchange itself is not different between these two scenarios. However, with the choice lane option, the intersection at 4050 West is estimated to experience lower delay, and better lane utilization without any added lanes at any of the intersections. Detailed results for this configuration are attached in **Appendix D**.

3.4 Final Concept Scenario

As the concept design progressed and construction cost estimates were prepared, it became evident that the project would cost more than the programmed budget. As such, the design team began looking for potential cost savings. One of the items considered was reducing the number of lanes for the southbound left and westbound left turn movements from two to one. Thus, a traffic analysis was performed for this new scenario.

For this analysis, **Volume Set 3** was used, which had the highest volumes of any of the three volume sets. Most of the increase was on the west side of the Bangerter Highway due to better connectivity to Mountain View Corridor. The Eastbound Choice Lane scenario was analyzed with the new volume set to provide a basis of comparison for the Final Concept scenario.

Table 11 presents the level of service (LOS) and delay in seconds per vehicle for the 2050 AM and PM peak hours for both scenarios. Overall, the delay and LOS remains approximately the same for 13400 South interchange in the Final Concept scenario. The largest impact is at 4050 West where the AM delay increases from 110 sec/veh to 124 sec/veh. This appears to be due to the eastbound through movement at the interchange not getting as much green time due to the westbound left turn staying green longer because of the higher per-lane volume. This then leads to additional eastbound queuing, which ultimately affects the 4050 West intersection more than the Bangerter Highway interchange.

Table 11. 2050 Final Concept Scenario Delay and Level of Service Comparison

Location	2050 AM Peak Hour		2050 PM Peak Hour	
	Eastbound Choice Lane	Final Concept	Eastbound Choice Lane	Final Concept
13400 South & Bangerter Hwy	D / 46	D / 44	D / 47	D / 46
13400 South & 4050 West	F / 110	F / 124	F / 91	F / 98
13400 South & Market Center Dr	B / 12	B / 12	C / 29	C / 28
13400 South & Hamilton View Rd	C / 25	C / 25	D / 54	D / 48

The 4050 West intersection has some 2050 failure in all the volume sets, but that failure gets worse with each successive volume set as the east-west volumes get larger and larger. Besides the general lack of east-west capacity, there is also an issue with the northbound approach which is the lack of an exclusive right turn lane. This is particularly concerning issue in the AM peak period when vehicles are heading for Bangerter Highway. For years, this was a T-intersection so there was no need for separate through and right turn lanes; however, a north leg has recently opened which means that what used to be a right turn only lane is now a shared through-right lane. Because the heavier right turn movement will regularly be blocked by the smaller through movement, the northbound approach is expected to fail in all 2050 AM scenarios.

The 95th percentile queue lengths for the Final Concept scenario area presented in **Table 12**. Queue lengths between the two scenarios remain roughly the same with the largest difference being eastbound 13400 South at 4050 West in the 2050 PM peak hour. Detailed results for the comparing configurations are attached in **Appendix E**.

Table 12. 2050 Final Concept Scenario 95th Percentile Queue Lengths Comparison

Intersection	Approach	2050 AM Peak Hour		2050 PM Peak Hour	
		Eastbound Choice Lane	Final Concept	Eastbound Choice Lane	Final Concept
13400 South & Bangerter Hwy	Northbound	775	750	500	500
13400 South & Bangerter Hwy	Southbound	275	300	600	550
13400 South & Bangerter Hwy	Eastbound	900	875	600	725
13400 South & Bangerter Hwy	Westbound	525	525	825	800
13400 South & 4050 West	Eastbound	4,275	4,400	3,775	4,300
13400 South & Hamilton View Rd	Westbound	675	675	1,075	925

3.5 Turning Vehicle Storage Lengths

After completing analysis of the various scenarios, recommended turning vehicle storage lengths values were developed for the 13400 South interchange based on data from the Final Concept scenario. The recommended values are shown in **Table 13**.

Table 13. 13400 South Recommended Storage Lengths

Turning Movement	Number of Lanes	Storage (feet/lane)
NB Left	3	750
NB Right	1	200
SB Left	1	450
SB Right	2	600
EB Left	2	600
EB Right	1	500
WB Left	1	350
WB Right	1	150

3.6 Volume Sensitivity Test

Near the end of the environmental study, a volume sensitivity analysis was performed using the fourth volume set described in Section 2.1. This volume scenario assumes there is no 14400 South connection between Herriman and Bluffdale. Without this connection, the volumes increase at the 13400 South interchange, especially on the west side of the interchange. **Table 14** compares the intersection LOS and delay between the Final Concept and Sensitivity Test scenarios. The largest traffic impact is at 4050 West where the AM delay increases from 124 sec/veh to 144 sec/veh and the PM delay increases from 98 sec/veh to 122 sec/veh. The intersections at Market Center Drive and Hamilton View Road the same or operate marginally better during the AM and PM peak hours due to the slight volume decrease on the east side of Bangerter Highway.

Table 14. 2050 Volume Sensitivity Test Delay and Level of Service Comparison

Location	2050 AM Peak Hour		2050 PM Peak Hour	
	Final Concept	Sensitivity Test	Final Concept	Sensitivity Test
13400 South & Bangerter Hwy	D / 44	D / 49	D / 46	D / 43
13400 South & 4050 West	F / 124	F / 145	F / 98	F / 122
13400 South & Market Center Dr	B / 12	B / 12	C / 28	C / 27
13400 South & Hamilton View Rd	C / 25	C / 22	D / 48	D / 43

The 95th percentile queue lengths for the Sensitivity Test scenario are presented in **Table 15**. Queue lengths between the two scenarios remain roughly the same with the largest difference being northbound at the 13400 South SPUI in the 2050 AM peak hour. Detailed results for the comparing configurations are attached in **Appendix F**.

Table 15. 2050 Final Concept Scenario 95th Percentile Queue Lengths Comparison

Intersection	Approach	2050 AM Peak Hour		2050 PM Peak Hour	
		Final Concept	Sensitivity Test	Final Concept	Sensitivity Test
13400 South & Bangerter Hwy	Northbound	750	750	500	525
13400 South & Bangerter Hwy	Southbound	300	400	550	825
13400 South & Bangerter Hwy	Eastbound	875	1,075	725	875
13400 South & Bangerter Hwy	Westbound	525	400	800	650
13400 South & 4050 West	Eastbound	4,400	4,400	4,300	4,400
13400 South & Hamilton View Rd	Westbound	675	175	925	275

The study team decided to not make any changes to the interchange design based on the sensitivity test because the sensitivity test volumes were considered fairly speculative, largely due to the express lane on 13400 South that pulls traffic from 12600 South. It is likely that the 2023 RTP will not include the express lanes, which would reduce the 2050 volumes at the 13400 South making the proposed interchange design adequate to accommodate the anticipated 2050 traffic demand.

4 INTERMEDIATE TERM ANALYSIS

Due to funding constraints, there was a desire to understand whether there were some components of the interchange that could be phased with the initial construction being less than the full build out. To determine this an intermediate term traffic analysis was conducted for 2030 conditions to answer the following questions:

1. Will the interchange need three northbound left turn and two southbound right turn lanes in 2030?
2. How many lanes are needed at merge and exits at freeway by 2030?

The answer to the first question is explored in this section. The second question is addressed in Section 5 of this memo. The WFRC travel model was used to develop future study area traffic volumes for 2030 conditions based on the RTP Phase 1 roadway network. The peak hour volumes for 2030 scenario are presented in figures located in **Appendix A**.

Table 16 presents the level of service (LOS) and delay in seconds per vehicle for the AM and PM peak hours for the base (dual northbound lefts/single southbound right) and additional lanes scenarios. During the 2030 AM peak hour, the 13400 South interchange operates at LOS D in both scenarios. However, during the PM peak hour the dual lefts scenario operates at LOS F, while the triple lefts scenario operates at LOS D. This indicates that triple northbound lefts and dual southbound rights should be built as part of the initial construction.

Table 16. 2030 Triple Lefts Scenario Intersection Delay and Level of Service Comparison

Location	2030 AM Peak Hour		2030 PM Peak Hour	
	Base SPUI	Additional Lanes	Base SPUI	Additional Lanes
13400 South & Bangerter Hwy	D / 38	D / 37	F / 159	D / 39
13400 South & 4050 West	E / 58	E / 68	D / 41	D / 45
13400 South & Market Center Dr	B / 11	B / 11	C / 26	C / 26
13400 South & Hamilton View Rd	C / 21	C / 21	D / 49	D / 50

The 95th percentile queue lengths presented in **Table 17** are of approaches having notable queues for the two scenarios. It is observed that queues for all the approaches shown go down for the Additional Lanes scenario compared to Base SPUI scenario.

Table 17. 2030 Interchange 95th Percentile Queue Lengths for all SPUI Scenarios

Intersection	Approach	2030 AM Peak Hour		2030 PM Peak Hour	
		Base SPUI	Additional Lanes	Base SPUI	Additional Lanes
13400 South & Bangerter Hwy	Northbound	500	350	650	375
13400 South & Bangerter Hwy	Southbound	175	150	7,725	350
13400 South & Bangerter Hwy	Eastbound	575	650	425	400
13400 South & Bangerter Hwy	Westbound	225	225	375	475
13400 South & 4050 West	Eastbound	825	1,375	575	775
13400 South & Hamilton View Rd	Westbound	375	350	325	575

Based on this analysis, 13400 South SPUI will need the triple northbound lefts and dual southbound rights by 2030. Detailed analysis results can be found in **Appendix G**.

5 FREEWAY RAMP ANALYSIS

Separate analyses were performed to determine the appropriate off-ramp configuration, gap acceptance lengths for the freeway on-ramps, and the required ramp meter storage to meet 2050 traffic demands.

5.1 Off-Ramp Analysis

This analysis compares the performance of Bangerter mainline at the 13400 South interchange based on different off-ramp configurations. The analysis was performed for both 2030 and 2050 conditions. For 2050, **Volume Set 3** was used for the analysis. Three different off-ramp configurations were analyzed:

1. **Two-Lane Exits** – This scenario assumed two lanes at the exit for both the southbound and northbound off-ramps, where the right-most exit lane would be an exit only lane and the second from the right lane would be a choice lane allowing vehicles willing continue traveling on the mainline or exit the freeway. The analysis assumed that there would be a southbound auxiliary lane between 12600 South and 13400 South and a northbound auxiliary lane from the 3600 West overpass to the 13400 South off-ramp (a distance of about 850 feet).
2. **Single Lane Exits** – This scenario assumed single lane exits for both the southbound and northbound off-ramps. Both exits would be from auxiliary lanes in the same configuration as the previous scenario.
3. **Taper Exits** – This scenario assumed single lane exits via a choice lane for both the southbound and northbound off-ramps. There are no auxiliary lanes in this scenario.

Table 18 presents the level of service (LOS) and density in vehicles/mile/lane for the AM and PM peak hours for the off-ramp scenarios. They generally all perform acceptably except for the northbound taper exit in 2050 which is at a LOS F for both the AM and PM peak hours. Overall, the two-lane exit scenario has the best performance (LOS B) for all time periods. Detailed analysis results can be found in **Appendix H**.

Table 18. 13400 South Off-Ramp Analysis Comparison

Peak Period	Scenario Description	2030 AM		2030 PM		2050 AM		2050 PM	
		Freeway Analysis Type	North-bound[1]	Freeway Analysis Type	South-bound[1]	Freeway Analysis Type	North-bound[1]	Freeway Analysis Type	South-bound[1]
AM	Two Lane Exit	Diverge	B / 15	Weave	B / 11	Diverge	B / 19	Weave	B / 15
	Single Lane Exit	Diverge	B / 17	Weave	B / 11	Diverge	D / 33	Weave	B / 16
	Taper Exit	Diverge	C / 23	Weave	B / 14	Diverge	F / 53	Weave	C / 21
PM	Two Lane Exit	Diverge	B / 19	Weave	B / 16	Diverge	C / 23	Weave	B / 18
	Single Lane Exit	Diverge	C / 23	Weave	B / 16	Diverge	D / 30	Weave	B / 19
	Taper Exit	Diverge	D / 34	Weave	C / 22	Diverge	F / 59	Weave	C / 26

[1]Density reported in vehicles/mile/lane

5.2 On-Ramp Analysis

An analysis was performed for the 13400 South on-ramps to determine what the gap acceptance lengths should be for both 2030 and 2050 conditions. Gap acceptance is used in the design of parallel entrance ramps and refers the distance that the on-ramp lane is carried after joining the mainline and before the lane is merged into the mainline via a taper. Essentially, it is the length for a vehicle entering the freeway to complete the merge maneuver with mainline traffic. Guidance for determination of gap acceptance length is provided in the UDOT *Roadway Design Manual* on drawing DM 10.1, Entrance Ramp Geometrics. Note C states that, "for a single lane parallel entrance ramp use a gap acceptance length of 1,200 feet if combined ramp and mainline acceptance lane volume is projected to exceed 2,400 passenger cars per hour during the peak hour. Use a 500-foot length otherwise."

Peak hour volumes for 2030 and 2050 conditions were developed for the 13400 South on-ramps and the Bangerter Highway mainline just upstream of the on-ramp. It was assumed that there would be an even distribution of traffic among mainline lanes on Bangerter Highway. Thus, the mainline acceptance lane volume was one-third of the mainline volume, since the RTP shows Bangerter Highway as a three-lane freeway. The on-ramp volume and the mainline acceptance lane volume were added together and then converted from vehicles to passenger cars by using principles described in Chapter 12 of the *Highway Capacity Manual, 6th Edition*. The resulting number was compared to the 2,400 passenger cars threshold used to determine whether the acceptance lane length should be 500 or 1,200 feet**. Table 19** shows the resulting combined ramp and mainline acceptance lane volume (in passenger cars) and the gap associated acceptance length for each on-ramp. It shows that 500 feet is required for both the northbound and southbound ramps in 2030 and 1,200 feet for both on-ramps in 2050.

Table 19. 13400 South Gap Acceptance Lengths

Year	Time Period	NB On-Ramp		SB On-Ramp	
		Acceptance Lane PC Volume (HCM)	Acceptance Lane Length (Feet)	Acceptance Lane PC Volume (HCM)	Acceptance Lane Length (Feet)
2030	AM	2,141	500	2,277	500
	PM	2,082		2,017	
2050	AM	2,522	1,200	2,588	1,200
	PM	2,369		2,464	

5.3 Ramp Meter Storage

Ramp meter storage requirements were obtained from information prepared as part of the Managed Motorways Study. Storage requirements are based on peak hour volumes with the larger of the AM and PM peak hours being used. **Table 20** shows the recommended ramp meter storage lengths for the 13400 South on-ramps.

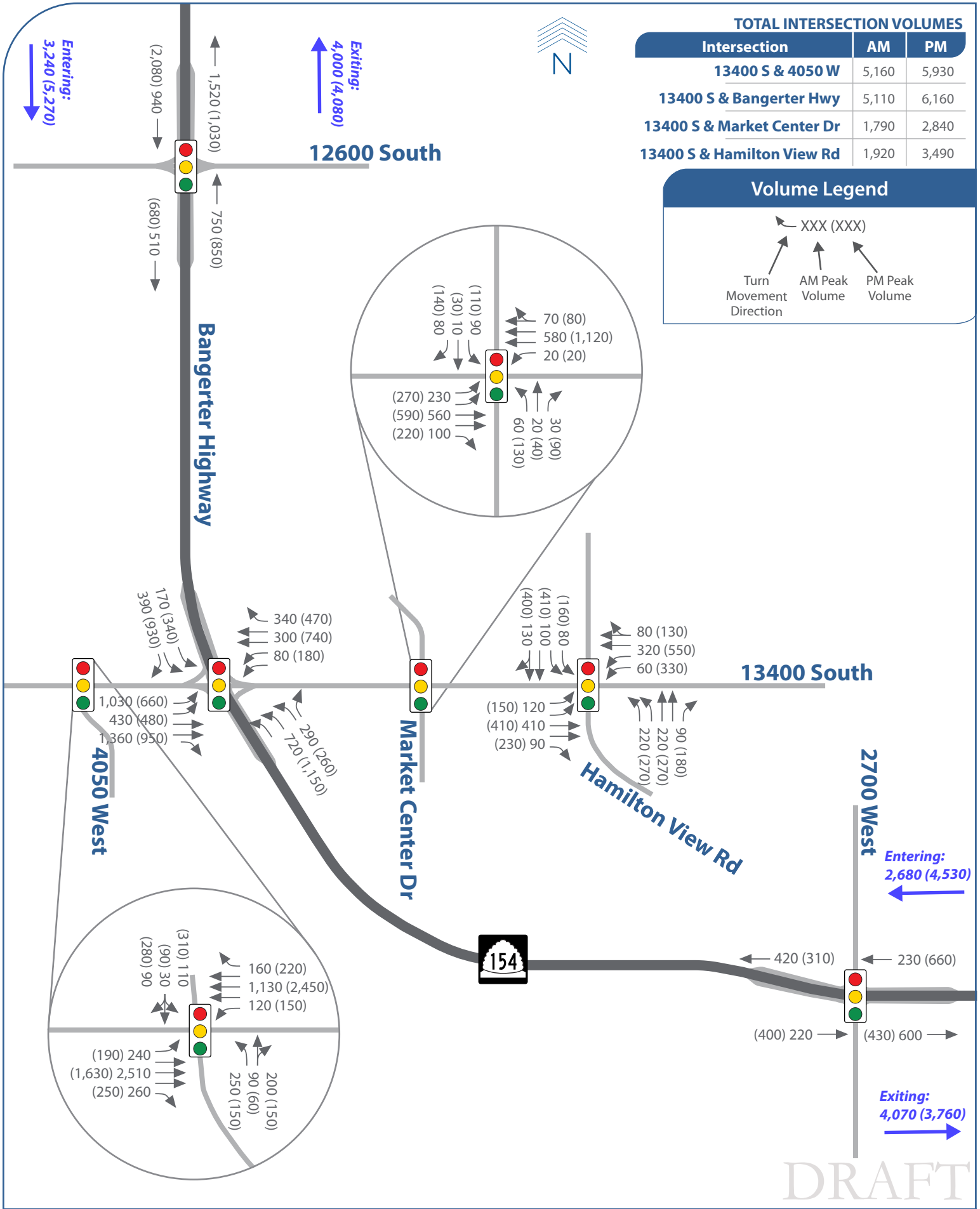
Table 20. 9800 South Ramp Meter Storage Requirements

On-Ramp	2050 Peak Hour Volume (veh /hr)		Total Storage Required (lane-feet)	Storage per Lane (feet)	
	AM	PM		3 Lanes	4 Lanes
Northbound	**1,680**	1,360	3,160	1,050	790
Southbound	**1,610**	1,520	2,980	990	750

6 CONCLUSION

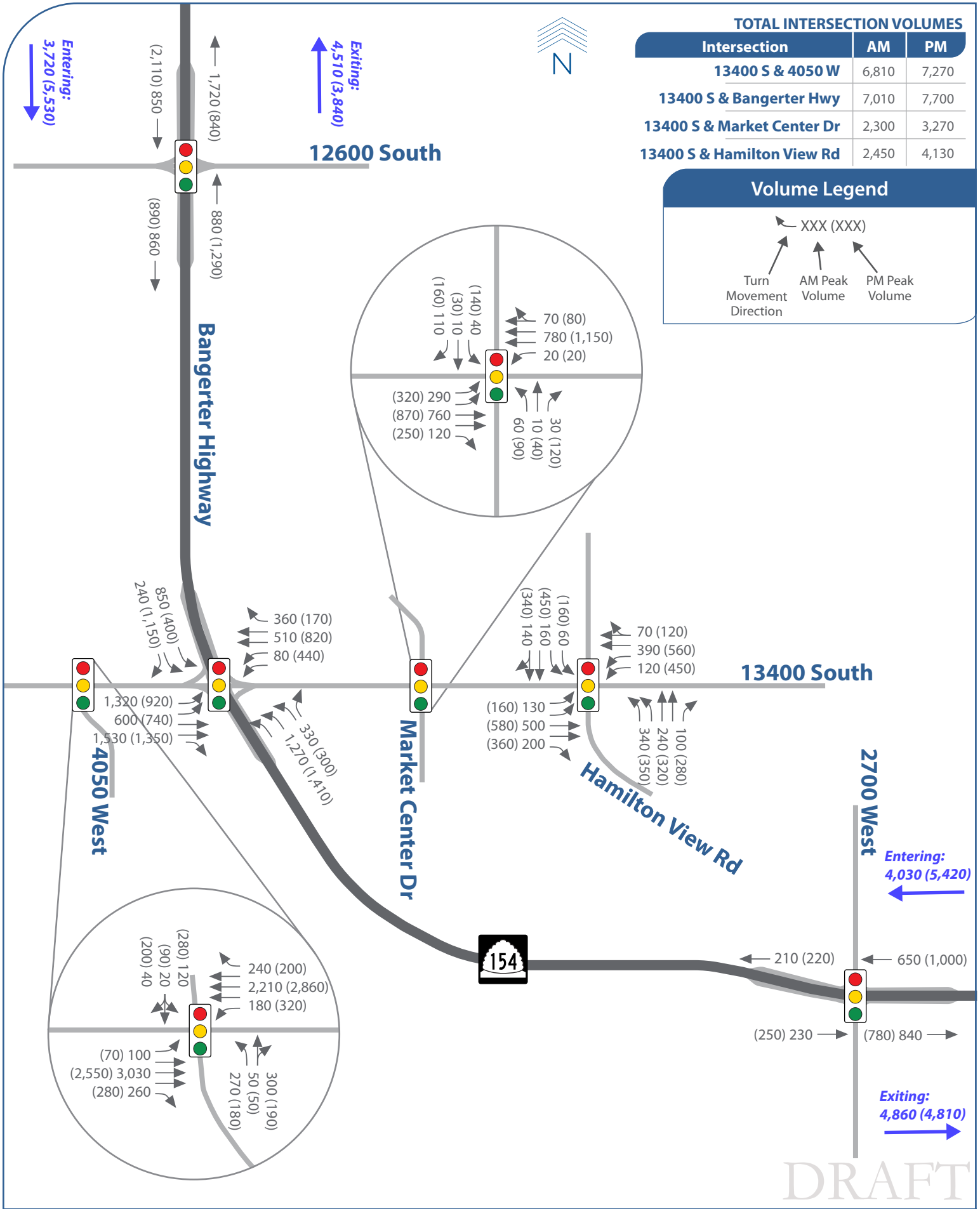
The traffic analysis shows that a grade-separated interchange will be required to meet the 2050 traffic demands at the intersection of Bangerter Highway & 13400 South. A SPUI was selected as the preferred interchange alternative due to its ability to accommodate future traffic demands. The interchange concept design includes the following number of left turn lanes: three northbound, one southbound, two eastbound, and one westbound. Dual right turn lanes are recommended for the southbound approach. It is also recommended that the left eastbound through lane approaching the interchange become a left turn trap lane at Bangerter Highway and that the middle lane be a choice lane allowing vehicles to either turn left or go straight.

Appendix A. 13400 South Peak Hour Traffic Volumes



2030 Build Peak Hour Traffic Volumes

13400 South & Bangerter Highway Environmental Study



2050 Build Peak Hour Traffic Volumes

13400 South & Bangerter Highway Environmental Study

Appendix B. Interchange Alternatives Analysis Vissim Node Results

2050NoBld_AM

LOS Category: Signalized

1: 13400S						Delay / LOS	
		Volume		Queue (ft) Avg / 95th		Analysis Period	
Mvmt	Demand	Served	% Served	900-4500		900-4500	
NBL	1,300	698	54%	6,175	7,250	1015	F
NBT	1,680	1,043	62%	100	425	516	F
NBR	310	195	63%	50	300	491	F
NB	**3,290**	**1,936**	**59%**			**693**	**F**
SBL	230	189	82%	1,600	4,725	545	F
SBT	2,240	1,939	87%	3,500	5,375	383	F
SBR	880	777	88%	0	0	277	F
SB	**3,350**	**2,905**	**87%**			**366**	**F**
EBL	1,440	774	54%	975	1,275	325	F
EBT	700	385	55%	775	1,275	133	F
EBR	1,660	952	57%	500	1,250	33	C
EB	**3,800**	**2,111**	**56%**			**158**	**F**
WBL	80	66	83%	0	75	160	F
WBT	680	532	78%	775	925	365	F
WBR	390	322	83%	0	0	108	F
WB	**1,150**	**920**	**80%**			**261**	**F**
Total	**11,590**	**7,872**	**68%**			**378**	**F**

Node Letter: T VISSIM ID: 134

LOS Category: Signalized

2: 4050W						Delay / LOS	
		Volume		Queue (ft) Avg / 95th		Analysis Period	
Mvmt	Demand	Served	% Served	900-4500		900-4500	
NBL	250	244	98%	650	2,200	169	F
NBT	80	75	94%	825	2,175	180	F
NBR	320	310	97%	850	2,200	161	F
NB	**650**	**629**	**97%**			**167**	**F**
SBL	130	128	98%	75	225	90	F
SBT	10	9	90%	0	25	53	D
SBR	40	41	103%	0	25	6	A
SB	**180**	**178**	**99%**			**69**	**E**
EBL	100	52	52%	25	100	1072	F
EBT	3,350	1,700	51%	8,700	10,025	1061	F
EBR	220	110	50%	0	50	1016	F
EB	**3,670**	**1,862**	**51%**			**1059**	**F**
WBL	220	153	70%	50	250	53	D
WBT	2,420	1,700	70%	150	550	36	D
WBR	220	155	70%	25	150	33	C
WB	**2,860**	**2,008**	**70%**			**37**	**D**
Total	**7,360**	**4,677**	**64%**			**462**	**F**

Node Letter: TA VISSIM ID: 3200

Bld_TDI_AM

LOS Category: Signalized

1: 13400S						Delay / LOS	
		Volume		Queue (ft) Avg / 95th		Analysis Period	
Mvmt	Demand	Served	% Served	900-4500		900-4500	
NBL	760	751	99%	325	1,425	77	E
NBR	470	471	100%	300	1,425	85	F
NB	**1,230**	**1,222**	**99%**			**80**	**E**
SBL	250	256	102%	50	175	62	E
SBR	370	370	100%	0	0	6	A
SB	**620**	**626**	**101%**			**29**	**C**
EBL	700	704	101%	125	350	63	E
EBT	500	481	96%	125	350	57	E
EBR	1,480	1,485	100%	0	0	6	A
EB	**2,680**	**2,670**	**100%**			**30**	**C**
WBL	100	95	95%	25	100	64	E
WBT	270	266	99%	50	200	69	E
WBR	320	313	98%	0	0	2	A
WB	**690**	**674**	**98%**			**37**	**D**
Total	**5,220**	**5,192**	**99%**			**43**	**D**

Node Letter: T VISSIM ID: 134

LOS Category: Signalized

2: 4050W						Delay / LOS	
		Volume		Queue (ft) Avg / 95th		Analysis Period	
Mvmt	Demand	Served	% Served	900-4500		900-4500	
NBL	200	203	102%	75	375	74	E
NBT	90	87	97%	100	525	73	E
NBR	220	219	100%	125	550	52	D
NB	**510**	**509**	**100%**			**64**	**E**
SBL	130	130	100%	50	175	63	E
SBT	20	21	105%	0	50	50	D
SBR	20	19	95%	0	25	2	A
SB	**170**	**170**	**100%**			**55**	**D**
EBL	100	104	104%	50	200	97	F
EBT	2,330	2,323	100%	150	725	24	C
EBR	280	280	100%	0	100	11	B
EB	**2,710**	**2,707**	**100%**			**26**	**C**
WBL	160	158	99%	125	425	113	F
WBT	1,110	1,105	100%	75	450	30	C
WBR	130	125	96%	25	150	24	C
WB	**1,400**	**1,388**	**99%**			**39**	**D**
Total	**4,790**	**4,774**	**100%**			**35**	**C**

Node Letter: TA VISSIM ID: 3200

Bld_SPUI_AM

LOS Category: Signalized

1: 13400S						Delay / LOS	
		Volume		Queue (ft) Avg / 95th		Analysis Period	
Mvmt	Demand	Served	% Served	900-4500		900-4500	
NBL	760	752	99%	175	525	67	E
NBR	470	470	100%	0	0	13	B
NB	**1,230**	**1,222**	**99%**			**47**	**D**
SBL	250	255	102%	50	175	50	D
SBR	370	370	100%	0	0	4	A
SB	**620**	**625**	**101%**			**23**	**C**
EBL	700	705	101%	175	425	80	E
EBT	500	481	96%	25	150	19	B
EBR	1,480	1,487	100%	0	0	9	A
EB	**2,680**	**2,673**	**100%**			**30**	**C**
WBL	100	95	95%	25	100	64	E
WBT	270	265	98%	25	150	33	C
WBR	320	314	98%	0	0	2	A
WB	**690**	**674**	**98%**			**23**	**C**
Total	**5,220**	**5,194**	**100%**			**32**	**C**

Node Letter: T VISSIM ID: 134

LOS Category: Signalized

2: 4050W						Delay / LOS	
		Volume		Queue (ft) Avg / 95th		Analysis Period	
Mvmt	Demand	Served	% Served	900-4500		900-4500	
NBL	200	204	102%	75	350	68	E
NBT	90	86	96%	100	550	68	E
NBR	220	220	100%	125	575	56	E
NB	**510**	**510**	**100%**			**63**	**E**
SBL	130	130	100%	50	175	59	E
SBT	20	20	100%	0	50	47	D
SBR	20	19	95%	0	25	2	A
SB	**170**	**169**	**99%**			**51**	**D**
EBL	100	104	104%	50	150	72	E
EBT	2,330	2,325	100%	250	825	28	C
EBR	280	281	100%	0	100	19	B
EB	**2,710**	**2,710**	**100%**			**29**	**C**
WBL	160	155	97%	225	725	210	F
WBT	1,110	1,105	100%	50	350	17	B
WBR	130	125	96%	0	125	13	B
WB	**1,400**	**1,385**	**99%**			**39**	**D**
Total	**4,790**	**4,774**	**100%**			**36**	**D**

Node Letter: TA VISSIM ID: 3200

2050NoBld_AM

LOS Category: Signalized

3: Market Center						Delay / LOS	
		Volume		Queue (ft) Avg / 95th		Analysis Period	
Mvmt	Demand	Served	% Served	900-4500		900-4500	
NBL	60	56	93%	50	225	161	F
NBT	10	10	100%	0	25	29	C
NBR	30	30	100%	0	25	13	B
NB	**100**	**96**	**96%**			**101**	**F**
SBL	30	28	93%	0	50	36	D
SBT	10	11	110%	0	25	37	D
SBR	110	108	98%	0	75	11	B
SB	**150**	**147**	**98%**			**18**	**B**
EBL	290	174	60%	25	125	39	D
EBT	830	517	62%	25	175	10	A
EBR	120	76	63%	25	200	4	A
EB	**1,240**	**767**	**62%**			**16**	**B**
WBL	20	18	90%	0	50	109	F
WBT	980	797	81%	400	650	186	F
WBR	70	53	76%	425	650	137	F
WB	**1,070**	**868**	**81%**			**182**	**F**
Total	**2,560**	**1,878**	**73%**			**97**	**F**

Node Letter: TB VISSIM ID: 3300

LOS Category: Signalized

4: Hamilton View						Delay / LOS	
		Volume		Queue (ft) Avg / 95th		Analysis Period	
Mvmt	Demand	Served	% Served	900-4500		900-4500	
NBL	430	335	78%	500	1,150	247	F
NBT	210	189	90%	25	125	114	F
NBR	80	66	83%	0	50	97	F
NB	**720**	**590**	**82%**			**188**	**F**
SBL	50	50	100%	0	50	50	D
SBT	160	159	99%	50	250	40	D
SBR	180	178	99%	50	250	48	D
SB	**390**	**387**	**99%**			**45**	**D**
EBL	150	90	60%	25	75	51	D
EBT	480	316	66%	25	175	27	C
EBR	260	166	64%	0	125	9	A
EB	**890**	**572**	**64%**			**26**	**C**
WBL	110	104	95%	25	125	98	F
WBT	460	416	90%	350	1,350	157	F
WBR	60	54	90%	350	1,375	148	F
WB	**630**	**574**	**91%**			**146**	**F**
Total	**2,630**	**2,123**	**81%**			**107**	**F**

Node Letter: TC VISSIM ID: 3400

Bld_TDI_AM

LOS Category: Signalized

3: Market Center						Delay / LOS	
		Volume		Queue (ft) Avg / 95th		Analysis Period	
Mvmt	Demand	Served	% Served	900-4500		900-4500	
NBL	50	49	98%	0	75	26	C
NBT	20	17	85%	0	25	23	C
NBR	40	41	103%	0	25	5	A
NB	**110**	**107**	**97%**			**17**	**B**
SBL	40	40	100%	0	50	27	C
SBT	10	9	90%	0	0	0	A
SBR	70	70	100%	0	50	5	A
SB	**120**	**119**	**99%**			**12**	**B**
EBL	280	279	100%	25	125	26	C
EBT	830	824	99%	0	175	8	A
EBR	110	104	95%	0	175	5	A
EB	**1,220**	**1,207**	**99%**			**12**	**B**
WBL	20	22	110%	0	50	27	C
WBT	570	554	97%	25	150	11	B
WBR	70	70	100%	25	150	8	A
WB	**660**	**646**	**98%**			**11**	**B**
Total	**2,110**	**2,079**	**99%**			**12**	**B**

Node Letter: TB VISSIM ID: 3300

LOS Category: Signalized

4: Hamilton View						Delay / LOS	
		Volume		Queue (ft) Avg / 95th		Analysis Period	
Mvmt	Demand	Served	% Served	900-4500		900-4500	
NBL	260	251	97%	25	125	31	C
NBT	240	242	101%	25	100	23	C
NBR	120	122	102%	0	100	5	A
NB	**620**	**615**	**99%**			**23**	**C**
SBL	70	70	100%	0	50	35	C
SBT	160	163	102%	25	125	30	C
SBR	110	108	98%	25	150	16	B
SB	**340**	**341**	**100%**			**26**	**C**
EBL	130	134	103%	25	100	35	C
EBT	550	552	100%	50	225	23	C
EBR	230	220	96%	25	150	9	A
EB	**910**	**906**	**100%**			**22**	**C**
WBL	120	126	105%	25	100	34	C
WBT	290	288	99%	25	150	21	C
WBR	70	68	97%	25	175	14	B
WB	**480**	**482**	**100%**			**24**	**C**
Total	**2,350**	**2,344**	**100%**			**23**	**C**

Node Letter: TC VISSIM ID: 3400

Bld_SPUI_AM

LOS Category: Signalized

3: Market Center						Delay / LOS	
		Volume		Queue (ft) Avg / 95th		Analysis Period	
Mvmt	Demand	Served	% Served	900-4500		900-4500	
NBL	50	49	98%	0	75	25	C
NBT	20	18	90%	0	50	27	C
NBR	40	41	103%	0	25	5	A
NB	**110**	**108**	**98%**			**18**	**B**
SBL	40	40	100%	0	50	27	C
SBT	10	9	90%	0	25	26	C
SBR	70	70	100%	0	50	5	A
SB	**120**	**119**	**99%**			**14**	**B**
EBL	280	279	100%	25	125	23	C
EBT	830	827	100%	0	150	6	A
EBR	110	102	93%	0	150	2	A
EB	**1,220**	**1,208**	**99%**			**9**	**A**
WBL	20	21	105%	0	50	25	C
WBT	570	556	98%	25	150	12	B
WBR	70	70	100%	25	150	9	A
WB	**660**	**647**	**98%**			**12**	**B**
Total	**2,110**	**2,082**	**99%**			**11**	**B**

Node Letter: TB VISSIM ID: 3300

LOS Category: Signalized

4: Hamilton View						Delay / LOS	
		Volume		Queue (ft) Avg / 95th		Analysis Period	
Mvmt	Demand	Served	% Served	900-4500		900-4500	
NBL	260	253	97%	25	125	34	C
NBT	240	242	101%	25	100	26	C
NBR	120	122	102%	0	50	5	A
NB	**620**	**617**	**100%**			**25**	**C**
SBL	70	70	100%	0	50	38	D
SBT	160	162	101%	25	125	32	C
SBR	110	108	98%	25	125	17	B
SB	**340**	**340**	**100%**			**29**	**C**
EBL	130	134	103%	25	100	39	D
EBT	550	551	100%	25	225	22	C
EBR	230	219	95%	0	125	9	A
EB	**910**	**904**	**99%**			**21**	**C**
WBL	120	126	105%	25	100	37	D
WBT	290	287	99%	25	150	20	B
WBR	70	68	97%	25	150	13	B
WB	**480**	**481**	**100%**			**24**	**C**
Total	**2,350**	**2,342**	**100%**			**24**	**C**

Node Letter: TC VISSIM ID: 3400

2050NoBld_PM

LOS Category: Signalized

1: 13400S						Delay / LOS	
		Volume		Queue (ft) Avg / 95th		Analysis Period	
Mvmt	Demand	Served	% Served	900-4500		900-4500	
NBL	1,400	1,202	86%	4,475	7,175	350	F
NBT	2,280	2,027	89%	4,850	8,000	291	F
NBR	290	263	91%	4,675	7,975	268	F
NB	**3,970**	**3,492**	**88%**			**310**	F
SBL	320	225	70%	50	175	528	F
SBT	1,880	1,351	72%	4,225	5,375	690	F
SBR	960	673	70%	250	3,050	513	F
SB	**3,160**	**2,249**	**71%**			**621**	F
EBL	920	421	46%	1,075	1,250	567	F
EBT	890	445	50%	1,075	1,275	241	F
EBR	1,390	723	52%	500	1,200	77	E
EB	**3,200**	**1,589**	**50%**			**253**	F
WBL	170	150	88%	25	125	103	F
WBT	990	834	84%	575	900	167	F
WBR	420	367	87%	0	0	37	D
WB	**1,580**	**1,351**	**86%**			**125**	F
Total	**11,910**	**8,681**	**73%**			**351**	F

Node Letter: T VISSIM ID: 134

LOS Category: Signalized

2: 4050W						Delay / LOS	
		Volume		Queue (ft) Avg / 95th		Analysis Period	
Mvmt	Demand	Served	% Served	900-4500		900-4500	
NBL	160	160	100%	50	225	50	D
NBT	40	38	95%	50	325	59	E
NBR	220	220	100%	75	350	49	D
NB	**420**	**418**	**100%**			**50**	D
SBL	340	111	33%	1,350	1,425	917	F
SBT	70	25	36%	50	100	752	F
SBR	230	79	34%	150	1,450	689	F
SB	**640**	**215**	**34%**			**814**	F
EBL	100	49	49%	25	125	1034	F
EBT	2,640	1,307	50%	7,825	10,025	1047	F
EBR	330	160	48%	0	75	992	F
EB	**3,070**	**1,516**	**49%**			**1041**	F
WBL	320	251	78%	550	2,025	210	F
WBT	2,860	2,317	81%	75	450	12	B
WBR	170	138	81%	0	50	10	A
WB	**3,350**	**2,706**	**81%**			**30**	C
Total	**7,480**	**4,855**	**65%**			**382**	F

Node Letter: TA VISSIM ID: 3200

Bld_TDI_PM

LOS Category: Signalized

1: 13400S						Delay / LOS	
		Volume		Queue (ft) Avg / 95th		Analysis Period	
Mvmt	Demand	Served	% Served	900-4500		900-4500	
NBL	1,220	1,223	100%	300	1,125	75	E
NBR	440	444	101%	225	875	50	D
NB	**1,660**	**1,667**	**100%**			**68**	E
SBL	420	422	100%	150	550	110	F
SBR	580	584	101%	0	0	12	B
SB	**1,000**	**1,006**	**101%**			**53**	D
EBL	450	425	94%	275	1,025	112	F
EBT	540	515	95%	300	1,025	138	F
EBR	930	934	100%	0	0	16	B
EB	**1,920**	**1,874**	**98%**			**71**	E
WBL	270	275	102%	50	200	66	E
WBT	765	764	100%	200	675	70	E
WBR	490	492	100%	0	0	8	A
WB	**1,525**	**1,531**	**100%**			**49**	D
Total	**6,105**	**6,078**	**100%**			**62**	E

Node Letter: T VISSIM ID: 134

LOS Category: Signalized

2: 4050W						Delay / LOS	
		Volume		Queue (ft) Avg / 95th		Analysis Period	
Mvmt	Demand	Served	% Served	900-4500		900-4500	
NBL	220	220	100%	75	300	58	E
NBT	60	58	97%	25	200	49	D
NBR	130	127	98%	50	225	27	C
NB	**410**	**405**	**99%**			**47**	D
SBL	270	269	100%	150	675	70	E
SBT	50	54	108%	25	75	60	E
SBR	240	236	98%	25	150	21	C
SB	**560**	**559**	**100%**			**49**	D
EBL	130	131	101%	125	400	164	F
EBT	1,520	1,512	99%	75	400	26	C
EBR	230	228	99%	0	75	6	A
EB	**1,880**	**1,871**	**100%**			**34**	C
WBL	130	135	104%	50	200	72	E
WBT	2,305	2,288	99%	150	725	24	C
WBR	130	134	103%	0	100	22	C
WB	**2,565**	**2,557**	**100%**			**27**	C
Total	**5,415**	**5,392**	**100%**			**33**	C

Node Letter: TA VISSIM ID: 3200

Bld_SPUI_PM

LOS Category: Signalized

1: 13400S						Delay / LOS	
		Volume		Queue (ft) Avg / 95th		Analysis Period	
Mvmt	Demand	Served	% Served	900-4500		900-4500	
NBL	1,220	1,217	100%	175	625	60	E
NBR	440	444	101%	75	575	38	D
NB	**1,660**	**1,661**	**100%**			**55**	D
SBL	420	434	103%	50	200	39	D
SBR	580	584	101%	0	0	7	A
SB	**1,000**	**1,018**	**102%**			**21**	C
EBL	450	444	99%	75	300	57	E
EBT	540	536	99%	75	375	41	D
EBR	930	937	101%	0	0	10	A
EB	**1,920**	**1,917**	**100%**			**29**	C
WBL	270	275	102%	50	200	63	E
WBT	765	768	100%	75	375	33	C
WBR	490	491	100%	0	0	3	A
WB	**1,525**	**1,534**	**101%**			**29**	C
Total	**6,105**	**6,130**	**100%**			**35**	C

Node Letter: T VISSIM ID: 134

LOS Category: Signalized

2: 4050W						Delay / LOS	
		Volume		Queue (ft) Avg / 95th		Analysis Period	
Mvmt	Demand	Served	% Served	900-4500		900-4500	
NBL	220	220	100%	75	300	58	E
NBT	60	58	97%	25	200	49	D
NBR	130	127	98%	50	225	27	C
NB	**410**	**405**	**99%**			**47**	D
SBL	270	270	100%	125	575	66	E
SBT	50	54	108%	25	75	57	E
SBR	240	237	99%	25	175	19	B
SB	**560**	**561**	**100%**			**45**	D
EBL	130	132	102%	125	400	157	F
EBT	1,520	1,517	100%	75	375	25	C
EBR	230	228	99%	0	100	6	A
EB	**1,880**	**1,877**	**100%**			**32**	C
WBL	130	134	103%	50	200	76	E
WBT	2,305	2,300	100%	75	425	15	B
WBR	130	135	104%	0	100	13	B
WB	**2,565**	**2,569**	**100%**			**18**	B
Total	**5,415**	**5,412**	**100%**			**28**	C

Node Letter: TA VISSIM ID: 3200

2050NoBld_PM

LOS Category: Signalized

3: Market Center		Volume		Queue (ft) Avg / 95th		Analysis Period	Delay / LOS
Mvmt	Demand	Served	% Served	900-4500		900-4500	
NBL	120	122	102%	25	175	48	D
NBT	30	29	97%	0	50	48	D
NBR	90	87	97%	0	50	5	A
NB	**240**	**238**	**99%**			**33**	**C**
SBL	150	152	101%	50	250	68	E
SBT	30	30	100%	0	75	61	E
SBR	170	166	98%	0	75	6	A
SB	**350**	**348**	**99%**			**38**	**D**
EBL	310	199	64%	25	125	40	D
EBT	950	583	61%	25	125	10	A
EBR	240	156	65%	25	150	5	A
EB	**1,500**	**938**	**63%**			**15**	**B**
WBL	20	18	90%	0	50	80	E
WBT	1,290	1,106	86%	200	625	71	E
WBR	70	58	83%	200	625	51	D
WB	**1,380**	**1,182**	**86%**			**70**	**E**
Total	**3,470**	**2,706**	**78%**			**44**	**D**

Node Letter: TB VISSIM ID: 3300

LOS Category: Signalized

4: Hamilton View		Volume		Queue (ft) Avg / 95th		Analysis Period	Delay / LOS
Mvmt	Demand	Served	% Served	900-4500		900-4500	
NBL	360	348	97%	275	850	169	F
NBT	330	333	101%	100	800	63	E
NBR	280	268	96%	25	150	16	B
NB	**970**	**949**	**98%**			**89**	**F**
SBL	180	142	79%	50	125	405	F
SBT	470	367	78%	1,425	1,900	430	F
SBR	380	299	79%	1,450	1,900	415	F
SB	**1,030**	**808**	**78%**			**420**	**F**
EBL	180	126	70%	25	125	69	E
EBT	640	438	68%	25	150	20	B
EBR	370	259	70%	0	125	9	A
EB	**1,190**	**823**	**69%**			**24**	**C**
WBL	470	380	81%	1,850	3,750	486	F
WBT	640	553	86%	350	2,825	272	F
WBR	130	105	81%	350	2,825	273	F
WB	**1,240**	**1,038**	**84%**			**351**	**F**
Total	**4,430**	**3,618**	**82%**			**223**	**F**

Node Letter: TC VISSIM ID: 3400

Bld_TDI_PM

LOS Category: Signalized

3: Market Center		Volume		Queue (ft) Avg / 95th		Analysis Period	Delay / LOS
Mvmt	Demand	Served	% Served	900-4500		900-4500	
NBL	120	121	101%	25	175	52	D
NBT	40	39	98%	0	75	44	D
NBR	90	88	98%	0	50	5	A
NB	**250**	**248**	**99%**			**34**	**C**
SBL	120	118	98%	50	200	65	E
SBT	30	29	97%	0	0	1	A
SBR	140	140	100%	0	75	9	A
SB	**290**	**287**	**99%**			**31**	**C**
EBL	310	314	101%	50	250	59	E
EBT	850	840	99%	50	350	17	B
EBR	240	238	99%	50	350	9	A
EB	**1,400**	**1,392**	**99%**			**25**	**C**
WBL	20	20	100%	0	50	65	E
WBT	1,265	1,271	100%	75	350	19	B
WBR	80	78	98%	75	350	18	B
WB	**1,365**	**1,369**	**100%**			**20**	**B**
Total	**3,305**	**3,296**	**100%**			**24**	**C**

Node Letter: TB VISSIM ID: 3300

LOS Category: Signalized

4: Hamilton View		Volume		Queue (ft) Avg / 95th		Analysis Period	Delay / LOS
Mvmt	Demand	Served	% Served	900-4500		900-4500	
NBL	340	341	100%	125	400	96	F
NBT	280	289	103%	50	175	45	D
NBR	230	221	96%	25	125	6	A
NB	**850**	**851**	**100%**			**56**	**D**
SBL	140	135	96%	25	125	92	F
SBT	490	479	98%	275	950	84	F
SBR	350	351	100%	300	950	77	E
SB	**980**	**965**	**98%**			**83**	**F**
EBL	150	146	97%	25	125	63	E
EBT	540	550	102%	50	250	32	C
EBR	370	358	97%	50	275	18	B
EB	**1,060**	**1,054**	**99%**			**32**	**C**
WBL	440	438	100%	100	275	66	E
WBT	675	676	100%	75	300	29	C
WBR	100	99	99%	75	325	25	C
WB	**1,215**	**1,213**	**100%**			**42**	**D**
Total	**4,105**	**4,083**	**99%**			**52**	**D**

Node Letter: TC VISSIM ID: 3400

Bld_SPUI_PM

LOS Category: Signalized

3: Market Center		Volume		Queue (ft) Avg / 95th		Analysis Period	Delay / LOS
Mvmt	Demand	Served	% Served	900-4500		900-4500	
NBL	120	121	101%	50	175	53	D
NBT	40	39	98%	0	75	46	D
NBR	90	88	98%	0	50	5	A
NB	**250**	**248**	**99%**			**35**	**C**
SBL	120	118	98%	50	175	64	E
SBT	30	29	97%	0	0	1	A
SBR	140	140	100%	0	75	9	A
SB	**290**	**287**	**99%**			**31**	**C**
EBL	310	316	102%	75	200	61	E
EBT	850	851	100%	25	325	13	B
EBR	240	243	101%	25	325	4	A
EB	**1,400**	**1,410**	**101%**			**22**	**C**
WBL	20	20	100%	0	50	64	E
WBT	1,265	1,273	101%	75	325	19	B
WBR	80	78	98%	75	350	18	B
WB	**1,365**	**1,371**	**100%**			**20**	**B**
Total	**3,305**	**3,316**	**100%**			**23**	**C**

Node Letter: TB VISSIM ID: 3300

LOS Category: Signalized

4: Hamilton View		Volume		Queue (ft) Avg / 95th		Analysis Period	Delay / LOS
Mvmt	Demand	Served	% Served	900-4500		900-4500	
NBL	340	341	100%	125	400	96	F
NBT	280	289	103%	50	175	45	D
NBR	230	221	96%	25	125	6	A
NB	**850**	**851**	**100%**			**55**	**D**
SBL	140	135	96%	25	125	101	F
SBT	490	481	98%	325	1,050	97	F
SBR	350	353	101%	350	1,075	89	F
SB	**980**	**969**	**99%**			**95**	**F**
EBL	150	147	98%	50	125	71	E
EBT	540	551	102%	25	175	20	B
EBR	370	358	97%	25	200	12	B
EB	**1,060**	**1,056**	**100%**			**25**	**C**
WBL	440	438	100%	100	275	66	E
WBT	675	676	100%	75	300	29	C
WBR	100	99	99%	75	325	25	C
WB	**1,215**	**1,213**	**100%**			**42**	**D**
Total	**4,105**	**4,089**	**100%**			**53**	**D**

Node Letter: TC VISSIM ID: 3400

Appendix C. Additional Lanes Analysis Vissim Node Results

2050Bld_SPUI_AM_No126Conn

LOS Category: Signalized

1: 13400S						Delay / LOS	
		Volume		Queue (ft) Avg / 95th		Analysis Period	
Mvmt	Demand	Served	% Served	900-4500		900-4500	
NBL	900	862	96%	475	1,450	132	F
NBR	360	360	100%	400	1,425	94	F
NB	**1,260**	**1,222**	**97%**			**120**	**F**
SBL	290	286	99%	50	175	54	D
SBR	660	667	101%	0	0	9	A
SB	**950**	**953**	**100%**			**23**	**C**
EBL	1,320	1,199	91%	575	1,275	102	F
EBT	540	485	90%	50	225	43	D
EBR	1,270	1,194	94%	0	0	5	A
EB	**3,130**	**2,878**	**92%**			**52**	**D**
WBL	90	99	110%	25	100	68	E
WBT	380	378	99%	75	250	55	D
WBR	440	430	98%	0	0	3	A
WB	**910**	**907**	**100%**			**32**	**C**
Total	**6,250**	**5,960**	**95%**			**58**	**E**

Node Letter: T VISSIM ID: 134

LOS Category: Signalized

2: 4050W						Delay / LOS	
		Volume		Queue (ft) Avg / 95th		Analysis Period	
Mvmt	Demand	Served	% Served	900-4500		900-4500	
NBL	240	216	90%	1,650	2,750	372	F
NBT	50	44	88%	1,700	2,725	362	F
NBR	320	290	91%	1,725	2,750	318	F
NB	**610**	**550**	**90%**			**343**	**F**
SBL	130	130	100%	50	200	76	E
SBT	20	22	110%	0	50	56	E
SBR	20	19	95%	0	25	3	A
SB	**170**	**171**	**101%**			**65**	**E**
EBL	90	85	94%	25	125	174	F
EBT	2,680	2,482	93%	1,950	4,400	164	F
EBR	280	255	91%	0	125	150	F
EB	**3,050**	**2,822**	**93%**			**163**	**F**
WBL	180	173	96%	75	300	82	F
WBT	1,550	1,531	99%	50	425	16	B
WBR	210	205	98%	0	175	14	B
WB	**1,940**	**1,909**	**98%**			**22**	**C**
Total	**5,770**	**5,452**	**94%**			**129**	**F**

Node Letter: TA VISSIM ID: 3200

2050BldSPUIAM_3NBL

LOS Category: Signalized

1: 13400S						Delay / LOS	
		Volume		Queue (ft) Avg / 95th		Analysis Period	
Mvmt	Demand	Served	% Served	900-4500		900-4500	
NBL	900	893	99%	150	400	72	E
NBR	360	369	103%	0	0	15	B
NB	**1,260**	**1,262**	**100%**			**55**	**D**
SBL	290	285	98%	50	200	58	E
SBR	660	667	101%	0	125	11	B
SB	**950**	**952**	**100%**			**25**	**C**
EBL	1,320	1,298	98%	325	850	63	E
EBT	540	517	96%	75	600	37	D
EBR	1,270	1,264	100%	0	0	11	B
EB	**3,130**	**3,079**	**98%**			**37**	**D**
WBL	90	99	110%	25	100	70	E
WBT	380	377	99%	100	250	68	E
WBR	440	430	98%	0	0	2	A
WB	**910**	**906**	**100%**			**37**	**D**
Total	**6,250**	**6,199**	**99%**			**39**	**D**

Node Letter: T VISSIM ID: 134

LOS Category: Signalized

2: 4050W						Delay / LOS	
		Volume		Queue (ft) Avg / 95th		Analysis Period	
Mvmt	Demand	Served	% Served	900-4500		900-4500	
NBL	240	210	88%	1,975	2,750	441	F
NBT	50	42	84%	2,025	2,725	433	F
NBR	320	280	88%	2,075	2,750	410	F
NB	**610**	**532**	**87%**			**423**	**F**
SBL	130	130	100%	50	200	75	E
SBT	20	22	110%	0	50	55	D
SBR	20	19	95%	0	25	3	A
SB	**170**	**171**	**101%**			**64**	**E**
EBL	90	90	100%	25	150	73	E
EBT	2,680	2,674	100%	300	1,125	30	C
EBR	280	276	99%	0	100	22	C
EB	**3,050**	**3,040**	**100%**			**31**	**C**
WBL	180	175	97%	75	325	73	E
WBT	1,550	1,558	101%	50	325	19	B
WBR	210	206	98%	25	175	20	B
WB	**1,940**	**1,939**	**100%**			**24**	**C**
Total	**5,770**	**5,682**	**98%**			**66**	**E**

Node Letter: TA VISSIM ID: 3200

2050Bld_SPUI_PM_No126Conn

LOS Category: Signalized

1: 13400S						Delay / LOS	
		Volume		Queue (ft) Avg / 95th		Analysis Period	
Mvmt	Demand	Served	% Served	900-4500		900-4500	
NBL	1,280	1,250	98%	325	850	83	F
NBR	350	359	103%	200	800	64	E
NB	**1,630**	**1,609**	**99%**			**79**	**E**
SBL	490	497	101%	50	250	50	D
SBR	1,100	1,110	101%	0	150	16	B
SB	**1,590**	**1,607**	**101%**			**26**	**C**
EBL	730	698	96%	375	1,100	131	F
EBT	680	658	97%	225	1,100	43	D
EBR	1,090	1,083	99%	0	0	11	B
EB	**2,500**	**2,439**	**98%**			**54**	**D**
WBL	190	192	101%	50	150	55	D
WBT	780	776	99%	100	425	39	D
WBR	470	467	99%	0	0	3	A
WB	**1,440**	**1,435**	**100%**			**30**	**C**
Total	**7,160**	**7,090**	**99%**			**48**	**D**

Node Letter: T VISSIM ID: 134

LOS Category: Signalized

2: 4050W						Delay / LOS	
		Volume		Queue (ft) Avg / 95th		Analysis Period	
Mvmt	Demand	Served	% Served	900-4500		900-4500	
NBL	190	191	101%	100	350	77	E
NBT	50	48	96%	25	250	50	D
NBR	190	190	100%	50	275	27	C
NB	**430**	**429**	**100%**			**51**	**D**
SBL	270	268	99%	100	375	64	E
SBT	90	93	103%	25	125	53	D
SBR	190	186	98%	25	125	15	B
SB	**550**	**547**	**99%**			**46**	**D**
EBL	60	62	103%	25	125	101	F
EBT	2,040	2,002	98%	675	2,200	93	F
EBR	240	232	97%	25	125	72	E
EB	**2,340**	**2,296**	**98%**			**91**	**F**
WBL	320	313	98%	175	750	88	F
WBT	2,650	2,639	100%	200	1,275	26	C
WBR	190	184	97%	25	125	24	C
WB	**3,160**	**3,136**	**99%**			**32**	**C**
Total	**6,480**	**6,408**	**99%**			**56**	**E**

Node Letter: TA VISSIM ID: 3200

2050BldSPUIPM_3NBL

LOS Category: Signalized

1: 13400S						Delay / LOS	
		Volume		Queue (ft) Avg / 95th		Analysis Period	
Mvmt	Demand	Served	% Served	900-4500		900-4500	
NBL	1,280	1,257	98%	125	425	57	E
NBR	350	359	103%	0	0	18	B
NB	**1,630**	**1,616**	**99%**			**48**	**D**
SBL	490	496	101%	150	550	47	D
SBR	1,100	1,114	101%	150	500	42	D
SB	**1,590**	**1,610**	**101%**			**44**	**D**
EBL	730	733	100%	100	450	39	D
EBT	680	667	98%	50	325	22	C
EBR	1,090	1,096	101%	0	0	11	B
EB	**2,500**	**2,496**	**100%**			**23**	**C**
WBL	190	192	101%	25	125	53	D
WBT	780	775	99%	125	450	51	D
WBR	470	466	99%	0	0	3	A
WB	**1,440**	**1,433**	**100%**			**36**	**D**
Total	**7,160**	**7,155**	**100%**			**36**	**D**

Node Letter: T VISSIM ID: 134

LOS Category: Signalized

2: 4050W						Delay / LOS	
		Volume		Queue (ft) Avg / 95th		Analysis Period	
Mvmt	Demand	Served	% Served	900-4500		900-4500	
NBL	190	191	101%	75	250	58	E
NBT	50	48	96%	50	250	50	D
NBR	190	190	100%	50	275	32	C
NB	**430**	**429**	**100%**			**46**	**D**
SBL	270	269	100%	100	375	62	E
SBT	90	93	103%	25	125	47	D
SBR	190	187	98%	25	125	15	B
SB	**550**	**549**	**100%**			**44**	**D**
EBL	60	62	103%	25	125	78	E
EBT	2,040	2,032	100%	325	925	47	D
EBR	240	238	99%	25	150	32	C
EB	**2,340**	**2,332**	**100%**			**47**	**D**
WBL	320	314	98%	175	825	82	F
WBT	2,650	2,652	100%	200	1,000	24	C
WBR	190	185	97%	0	100	24	C
WB	**3,160**	**3,151**	**100%**			**30**	**C**
Total	**6,480**	**6,461**	**100%**			**38**	**D**

Node Letter: TA VISSIM ID: 3200

2050Bld_SPUI_AM_No126Conn

LOS Category: Signalized

3: Market Center							Delay / LOS
		Volume		Queue (ft) Avg / 95th		Analysis Period	
Mvmt	Demand	Served	% Served	900-4500		900-4500	
NBL	60	60	100%	0	75	26	C
NBT	20	18	90%	0	25	25	C
NBR	40	40	100%	0	50	5	A
NB	**120**	**118**	**98%**			**19**	**B**
SBL	40	40	100%	0	75	27	C
SBT	10	10	100%	0	25	26	C
SBR	100	98	98%	0	50	5	A
SB	**150**	**148**	**99%**			**12**	**B**
EBL	280	267	95%	25	125	25	C
EBT	790	746	94%	0	175	6	A
EBR	120	118	98%	0	175	3	A
EB	**1,190**	**1,131**	**95%**			**10**	**A**
WBL	20	22	110%	0	50	27	C
WBT	750	750	100%	25	175	13	B
WBR	80	78	98%	25	200	11	B
WB	**850**	**850**	**100%**			**13**	**B**
Total	**2,310**	**2,247**	**97%**			**12**	**B**

Node Letter: TB VISSIM ID: 3300

LOS Category: Signalized

4: Hamilton View							Delay / LOS
		Volume		Queue (ft) Avg / 95th		Analysis Period	
Mvmt	Demand	Served	% Served	900-4500		900-4500	
NBL	360	357	99%	50	150	35	C
NBT	240	246	103%	25	100	25	C
NBR	110	107	97%	0	50	4	A
NB	**710**	**710**	**100%**			**27**	**C**
SBL	70	70	100%	25	75	40	D
SBT	170	172	101%	25	150	34	C
SBR	140	139	99%	25	150	19	B
SB	**380**	**381**	**100%**			**30**	**C**
EBL	130	125	96%	25	100	41	D
EBT	520	490	94%	25	200	24	C
EBR	220	208	95%	0	125	9	A
EB	**870**	**823**	**95%**			**23**	**C**
WBL	110	113	103%	25	100	40	D
WBT	350	351	100%	25	175	23	C
WBR	60	57	95%	25	175	15	B
WB	**520**	**521**	**100%**			**26**	**C**
Total	**2,480**	**2,435**	**98%**			**26**	**C**

Node Letter: TC VISSIM ID: 3400

2050BldSPUIAM_3NBL

LOS Category: Signalized

3: Market Center							Delay / LOS
		Volume		Queue (ft) Avg / 95th		Analysis Period	
Mvmt	Demand	Served	% Served	900-4500		900-4500	
NBL	60	60	100%	0	75	26	C
NBT	20	18	90%	0	50	27	C
NBR	40	40	100%	0	50	5	A
NB	**120**	**118**	**98%**			**19**	**B**
SBL	40	40	100%	0	75	27	C
SBT	10	10	100%	0	25	28	C
SBR	100	98	98%	0	50	5	A
SB	**150**	**148**	**99%**			**12**	**B**
EBL	280	276	99%	25	150	25	C
EBT	790	771	98%	0	200	6	A
EBR	120	123	103%	0	200	3	A
EB	**1,190**	**1,170**	**98%**			**11**	**A**
WBL	20	22	110%	0	50	28	C
WBT	750	745	99%	25	175	12	B
WBR	80	78	98%	25	175	10	A
WB	**850**	**845**	**99%**			**12**	**B**
Total	**2,310**	**2,281**	**99%**			**12**	**B**

Node Letter: TB VISSIM ID: 3300

LOS Category: Signalized

4: Hamilton View							Delay / LOS
		Volume		Queue (ft) Avg / 95th		Analysis Period	
Mvmt	Demand	Served	% Served	900-4500		900-4500	
NBL	360	356	99%	50	150	35	C
NBT	240	245	102%	25	100	24	C
NBR	110	107	97%	0	50	4	A
NB	**710**	**708**	**100%**			**27**	**C**
SBL	70	70	100%	0	75	39	D
SBT	170	172	101%	25	150	34	C
SBR	140	140	100%	25	150	18	B
SB	**380**	**382**	**101%**			**29**	**C**
EBL	130	129	99%	25	100	39	D
EBT	520	509	98%	50	225	24	C
EBR	220	214	97%	0	150	9	A
EB	**870**	**852**	**98%**			**23**	**C**
WBL	110	113	103%	25	100	39	D
WBT	350	351	100%	25	175	24	C
WBR	60	57	95%	25	175	15	B
WB	**520**	**521**	**100%**			**26**	**C**
Total	**2,480**	**2,463**	**99%**			**26**	**C**

Node Letter: TC VISSIM ID: 3400

2050Bld_SPUI_PM_No126Conn

LOS Category: Signalized

3: Market Center							Delay / LOS
		Volume		Queue (ft) Avg / 95th		Analysis Period	
Mvmt	Demand	Served	% Served	900-4500		900-4500	
NBL	130	130	100%	50	200	50	D
NBT	40	41	103%	0	75	51	D
NBR	100	98	98%	0	50	5	A
NB	**270**	**269**	**100%**			**34**	**C**
SBL	140	139	99%	50	250	69	E
SBT	30	30	100%	0	75	59	E
SBR	170	166	98%	0	50	6	A
SB	**340**	**335**	**99%**			**37**	**D**
EBL	340	342	101%	75	225	70	E
EBT	930	922	99%	50	425	18	B
EBR	250	250	100%	50	425	6	A
EB	**1,520**	**1,514**	**100%**			**28**	**C**
WBL	20	21	105%	0	50	70	E
WBT	1,140	1,141	100%	50	300	20	B
WBR	70	68	97%	75	300	18	B
WB	**1,230**	**1,230**	**100%**			**21**	**C**
Total	**3,360**	**3,348**	**100%**			**27**	**C**

Node Letter: TB VISSIM ID: 3300

LOS Category: Signalized

4: Hamilton View							Delay / LOS
		Volume		Queue (ft) Avg / 95th		Analysis Period	
Mvmt	Demand	Served	% Served	900-4500		900-4500	
NBL	370	365	99%	250	750	158	F
NBT	320	328	103%	50	200	51	D
NBR	240	230	96%	0	75	11	B
NB	**930**	**923**	**99%**			**83**	**F**
SBL	130	125	96%	25	125	90	F
SBT	470	463	99%	275	1,175	88	F
SBR	340	342	101%	275	1,175	74	E
SB	**940**	**930**	**99%**			**83**	**F**
EBL	180	178	99%	50	150	75	E
EBT	560	557	99%	50	175	22	C
EBR	430	420	98%	50	275	19	B
EB	**1,170**	**1,155**	**99%**			**29**	**C**
WBL	420	419	100%	100	275	66	E
WBT	520	522	100%	50	250	29	C
WBR	100	97	97%	50	250	23	C
WB	**1,040**	**1,038**	**100%**			**44**	**D**
Total	**4,080**	**4,046**	**99%**			**58**	**E**

Node Letter: TC VISSIM ID: 3400

2050BldSPUIPM_3NBL

LOS Category: Signalized

3: Market Center							Delay / LOS
		Volume		Queue (ft) Avg / 95th		Analysis Period	
Mvmt	Demand	Served	% Served	900-4500		900-4500	
NBL	130	130	100%	50	200	51	D
NBT	40	41	103%	0	75	50	D
NBR	100	98	98%	0	50	5	A
NB	**270**	**269**	**100%**			**34**	**C**
SBL	140	139	99%	50	250	69	E
SBT	30	30	100%	0	75	59	E
SBR	170	166	98%	0	50	6	A
SB	**340**	**335**	**99%**			**37**	**D**
EBL	340	344	101%	75	225	68	E
EBT	930	929	100%	50	350	18	B
EBR	250	252	101%	50	350	7	A
EB	**1,520**	**1,525**	**100%**			**28**	**C**
WBL	20	21	105%	0	50	71	E
WBT	1,140	1,140	100%	50	275	20	B
WBR	70	68	97%	75	300	18	B
WB	**1,230**	**1,229**	**100%**			**21**	**C**
Total	**3,360**	**3,358**	**100%**			**26**	**C**

Node Letter: TB VISSIM ID: 3300

LOS Category: Signalized

4: Hamilton View							Delay / LOS
		Volume		Queue (ft) Avg / 95th		Analysis Period	
Mvmt	Demand	Served	% Served	900-4500		900-4500	
NBL	370	363	98%	250	750	160	F
NBT	320	328	103%	50	200	51	D
NBR	240	230	96%	0	100	10	A
NB	**930**	**921**	**99%**			**84**	**F**
SBL	130	125	96%	25	125	88	F
SBT	470	464	99%	250	1,000	86	F
SBR	340	343	101%	275	1,025	74	E
SB	**940**	**932**	**99%**			**82**	**F**
EBL	180	180	100%	50	150	69	E
EBT	560	560	100%	50	175	22	C
EBR	430	423	98%	50	225	17	B
EB	**1,170**	**1,163**	**99%**			**28**	**C**
WBL	420	419	100%	100	275	66	E
WBT	520	522	100%	50	250	29	C
WBR	100	97	97%	50	250	23	C
WB	**1,040**	**1,038**	**100%**			**44**	**D**
Total	**4,080**	**4,054**	**99%**			**57**	**E**

Node Letter: TC VISSIM ID: 3400

Appendix D. Eastbound Choice Lane Analysis Vissim Node Results

2050BldSPUIAM_3NBL

LOS Category: Signalized

1: 13400S — Delay / LOS

Mvmt	Demand	Volume Served	% Served	Queue (ft) Avg / 95th 900-4500		Analysis Period 900-4500	
NBL	900	893	99%	150	400	72	E
NBR	360	369	103%	0	0	15	B
NB	**1,260**	**1,262**	**100%**			**55**	D
SBL	290	285	98%	50	200	58	E
SBR	660	667	101%	0	125	11	B
SB	**950**	**952**	**100%**			**25**	C
EBL	1,320	1,298	98%	325	850	63	E
EBT	540	517	96%	75	600	37	D
EBR	1,270	1,264	100%	0	0	11	B
EB	**3,130**	**3,079**	**98%**			**37**	D
WBL	90	99	110%	25	100	70	E
WBT	380	377	99%	100	250	68	E
WBR	440	430	98%	0	0	2	A
WB	**910**	**906**	**100%**			**37**	D
Total	**6,250**	**6,199**	**99%**			**39**	D

Node Letter: T VISSIM ID: 134

LOS Category: Signalized

2: 4050W — Delay / LOS

Mvmt	Demand	Volume Served	% Served	Queue (ft) Avg / 95th 900-4500		Analysis Period 900-4500	
NBL	240	210	88%	1,975	2,750	441	F
NBT	50	42	84%	2,025	2,725	433	F
NBR	320	280	88%	2,075	2,750	410	F
NB	**610**	**532**	**87%**			**423**	F
SBL	130	130	100%	50	200	75	E
SBT	20	22	110%	0	50	55	D
SBR	20	19	95%	0	25	3	A
SB	**170**	**171**	**101%**			**64**	E
EBL	90	90	100%	25	150	73	E
EBT	2,680	2,674	100%	300	1,125	30	C
EBR	280	276	99%	0	100	22	C
EB	**3,050**	**3,040**	**100%**			**31**	C
WBL	180	175	97%	75	325	73	E
WBT	1,550	1,558	101%	50	325	19	B
WBR	210	206	98%	25	175	20	B
WB	**1,940**	**1,939**	**100%**			**24**	C
Total	**5,770**	**5,682**	**98%**			**66**	E

Node Letter: TA VISSIM ID: 3200

2050BldSPUIAM_3NBL+ ChoiceLn

LOS Category: Signalized

1: 13400S — Delay / LOS

Mvmt	Demand	Volume Served	% Served	Queue (ft) Avg / 95th 900-4500		Analysis Period 900-4500	
NBL	900	890	99%	150	400	73	E
NBR	360	369	103%	0	0	16	B
NB	**1,260**	**1,259**	**100%**			**57**	E
SBL	290	285	98%	50	200	58	E
SBR	660	667	101%	0	125	13	B
SB	**950**	**952**	**100%**			**26**	C
EBL	1,320	1,311	99%	300	750	56	E
EBT	540	521	96%	100	550	35	C
EBR	1,270	1,270	100%	0	0	14	B
EB	**3,130**	**3,102**	**99%**			**35**	C
WBL	90	99	110%	25	100	68	E
WBT	380	377	99%	100	275	70	E
WBR	440	430	98%	0	0	2	A
WB	**910**	**906**	**100%**			**38**	D
Total	**6,250**	**6,219**	**100%**			**39**	D

Node Letter: T VISSIM ID: 134

LOS Category: Signalized

2: 4050W — Delay / LOS

Mvmt	Demand	Volume Served	% Served	Queue (ft) Avg / 95th 900-4500		Analysis Period 900-4500	
NBL	240	219	91%	1,575	2,750	355	F
NBT	50	45	90%	1,600	2,725	347	F
NBR	320	294	92%	1,600	2,725	304	F
NB	**610**	**558**	**91%**			**328**	F
SBL	130	130	100%	50	225	77	E
SBT	20	22	110%	0	50	55	D
SBR	20	19	95%	0	25	3	A
SB	**170**	**171**	**101%**			**66**	E
EBL	90	90	100%	25	150	73	E
EBT	2,680	2,674	100%	325	1,250	33	C
EBR	280	276	99%	0	125	23	C
EB	**3,050**	**3,040**	**100%**			**33**	C
WBL	180	174	97%	75	325	70	E
WBT	1,550	1,557	100%	50	325	18	B
WBR	210	207	99%	25	175	20	B
WB	**1,940**	**1,938**	**100%**			**23**	C
Total	**5,770**	**5,707**	**99%**			**59**	E

Node Letter: TA VISSIM ID: 3200

2050BldSPUIPM_3NBL

LOS Category: Signalized

1: 13400S — Delay / LOS

Mvmt	Demand	Volume Served	% Served	Queue (ft) Avg / 95th 900-4500		Analysis Period 900-4500	
NBL	1,280	1,257	98%	125	425	57	E
NBR	350	359	103%	0	0	18	B
NB	**1,630**	**1,616**	**99%**			**48**	D
SBL	490	496	101%	150	550	47	D
SBR	1,100	1,114	101%	150	500	42	D
SB	**1,590**	**1,610**	**101%**			**44**	D
EBL	730	733	100%	100	450	39	D
EBT	680	667	98%	50	325	22	C
EBR	1,090	1,096	101%	0	0	11	B
EB	**2,500**	**2,496**	**100%**			**23**	C
WBL	190	192	101%	25	125	53	D
WBT	780	775	99%	125	450	51	D
WBR	470	466	99%	0	0	3	A
WB	**1,440**	**1,433**	**100%**			**36**	D
Total	**7,160**	**7,155**	**100%**			**36**	D

Node Letter: T VISSIM ID: 134

LOS Category: Signalized

2: 4050W — Delay / LOS

Mvmt	Demand	Volume Served	% Served	Queue (ft) Avg / 95th 900-4500		Analysis Period 900-4500	
NBL	190	191	101%	75	250	58	E
NBT	50	48	96%	50	250	50	D
NBR	190	190	100%	50	275	32	C
NB	**430**	**429**	**100%**			**46**	D
SBL	270	269	100%	100	375	62	E
SBT	90	93	103%	25	125	47	D
SBR	190	187	98%	25	125	15	B
SB	**550**	**549**	**100%**			**44**	D
EBL	60	62	103%	25	125	78	E
EBT	2,040	2,032	100%	325	925	47	D
EBR	240	238	99%	25	150	32	C
EB	**2,340**	**2,332**	**100%**			**47**	D
WBL	320	314	98%	175	825	82	F
WBT	2,650	2,652	100%	200	1,000	24	C
WBR	190	185	97%	0	100	24	C
WB	**3,160**	**3,151**	**100%**			**30**	C
Total	**6,480**	**6,461**	**100%**			**38**	D

Node Letter: TA VISSIM ID: 3200

2050BldSPUIPM_3NBL+ ChoiceLn

LOS Category: Signalized

1: 13400S — Delay / LOS

Mvmt	Demand	Volume Served	% Served	Queue (ft) Avg / 95th 900-4500		Analysis Period 900-4500	
NBL	1,280	1,255	98%	125	425	60	E
NBR	350	359	103%	0	0	21	C
NB	**1,630**	**1,614**	**99%**			**51**	D
SBL	490	497	101%	125	500	48	D
SBR	1,100	1,113	101%	125	475	42	D
SB	**1,590**	**1,610**	**101%**			**44**	D
EBL	730	734	101%	125	450	42	D
EBT	680	667	98%	50	425	23	C
EBR	1,090	1,097	101%	0	0	13	B
EB	**2,500**	**2,498**	**100%**			**24**	C
WBL	190	192	101%	25	125	51	D
WBT	780	774	99%	125	425	50	D
WBR	470	466	99%	0	0	3	A
WB	**1,440**	**1,432**	**99%**			**35**	C
Total	**7,160**	**7,154**	**100%**			**37**	D

Node Letter: T VISSIM ID: 134

LOS Category: Signalized

2: 4050W — Delay / LOS

Mvmt	Demand	Volume Served	% Served	Queue (ft) Avg / 95th 900-4500		Analysis Period 900-4500	
NBL	190	191	101%	75	250	58	E
NBT	50	48	96%	25	250	49	D
NBR	190	190	100%	25	250	26	C
NB	**430**	**429**	**100%**			**43**	D
SBL	270	269	100%	100	375	62	E
SBT	90	93	103%	25	125	47	D
SBR	190	186	98%	25	125	15	B
SB	**550**	**548**	**100%**			**44**	D
EBL	60	62	103%	25	125	78	E
EBT	2,040	2,037	100%	325	900	48	D
EBR	240	238	99%	25	150	33	C
EB	**2,340**	**2,337**	**100%**			**47**	D
WBL	320	313	98%	150	450	79	E
WBT	2,650	2,647	100%	200	1,000	24	C
WBR	190	184	97%	25	100	23	C
WB	**3,160**	**3,144**	**99%**			**29**	C
Total	**6,480**	**6,458**	**100%**			**38**	D

Node Letter: TA VISSIM ID: 3200

2050BldSPUIAM_3NBL

LOS Category: Signalized

3: Market Center — Delay / LOS

Mvmt	Demand	Volume Served	% Served	Queue (ft) Avg / 95th 900-4500		Analysis Period 900-4500	
NBL	60	60	100%	0	75	26	C
NBT	20	18	90%	0	50	27	C
NBR	40	40	100%	0	50	5	A
NB	**120**	**118**	**98%**			**19**	**B**
SBL	40	40	100%	0	75	27	C
SBT	10	10	100%	0	25	28	C
SBR	100	98	98%	0	50	5	A
SB	**150**	**148**	**99%**			**12**	**B**
EBL	280	276	99%	25	150	25	C
EBT	790	771	98%	0	200	6	A
EBR	120	123	103%	0	200	3	A
EB	**1,190**	**1,170**	**98%**			**11**	**A**
WBL	20	22	110%	0	50	28	C
WBT	750	745	99%	25	175	12	B
WBR	80	78	98%	25	175	10	A
WB	**850**	**845**	**99%**			**12**	**B**
Total	**2,310**	**2,281**	**99%**			**12**	**B**

Node Letter: TB VISSIM ID: 3300

LOS Category: Signalized

4: Hamilton View — Delay / LOS

Mvmt	Demand	Volume Served	% Served	Queue (ft) Avg / 95th 900-4500		Analysis Period 900-4500	
NBL	360	356	99%	50	150	35	C
NBT	240	245	102%	25	100	24	C
NBR	110	107	97%	0	50	4	A
NB	**710**	**708**	**100%**			**27**	**C**
SBL	70	70	100%	0	75	39	D
SBT	170	172	101%	25	150	34	C
SBR	140	140	100%	25	150	18	B
SB	**380**	**382**	**101%**			**29**	**C**
EBL	130	129	99%	25	100	39	D
EBT	520	509	98%	50	225	24	C
EBR	220	214	97%	0	150	9	A
EB	**870**	**852**	**98%**			**23**	**C**
WBL	110	113	103%	25	100	39	D
WBT	350	351	100%	25	175	24	C
WBR	60	57	95%	25	175	15	B
WB	**520**	**521**	**100%**			**26**	**C**
Total	**2,480**	**2,463**	**99%**			**26**	**C**

Node Letter: TC VISSIM ID: 3400

2050BldSPUIAM_3NBL+ ChoiceLn

LOS Category: Signalized

3: Market Center — Delay / LOS

Mvmt	Demand	Volume Served	% Served	Queue (ft) Avg / 95th 900-4500		Analysis Period 900-4500	
NBL	60	60	100%	0	75	25	C
NBT	20	18	90%	0	50	26	C
NBR	40	40	100%	0	50	5	A
NB	**120**	**118**	**98%**			**19**	**B**
SBL	40	40	100%	0	75	26	C
SBT	10	10	100%	0	25	24	C
SBR	100	98	98%	0	50	5	A
SB	**150**	**148**	**99%**			**12**	**B**
EBL	280	276	99%	25	125	25	C
EBT	790	773	98%	25	200	7	A
EBR	120	123	103%	25	200	3	A
EB	**1,190**	**1,172**	**98%**			**11**	**B**
WBL	20	22	110%	0	50	27	C
WBT	750	744	99%	25	175	12	B
WBR	80	78	98%	25	175	11	B
WB	**850**	**844**	**99%**			**12**	**B**
Total	**2,310**	**2,282**	**99%**			**12**	**B**

Node Letter: TB VISSIM ID: 3300

LOS Category: Signalized

4: Hamilton View — Delay / LOS

Mvmt	Demand	Volume Served	% Served	Queue (ft) Avg / 95th 900-4500		Analysis Period 900-4500	
NBL	360	356	99%	50	150	35	C
NBT	240	246	103%	25	100	25	C
NBR	110	107	97%	0	50	4	A
NB	**710**	**709**	**100%**			**27**	**C**
SBL	70	70	100%	25	75	40	D
SBT	170	172	101%	25	150	34	C
SBR	140	139	99%	25	150	18	B
SB	**380**	**381**	**100%**			**29**	**C**
EBL	130	129	99%	25	100	41	D
EBT	520	511	98%	50	225	24	C
EBR	220	215	98%	0	150	9	A
EB	**870**	**855**	**98%**			**23**	**C**
WBL	110	113	103%	25	100	39	D
WBT	350	351	100%	25	175	23	C
WBR	60	57	95%	25	175	15	B
WB	**520**	**521**	**100%**			**26**	**C**
Total	**2,480**	**2,466**	**99%**			**26**	**C**

Node Letter: TC VISSIM ID: 3400

2050BldSPUIPM_3NBL

LOS Category: Signalized

3: Market Center — Delay / LOS

Mvmt	Demand	Volume Served	% Served	Queue (ft) Avg / 95th 900-4500		Analysis Period 900-4500	
NBL	130	130	100%	50	200	51	D
NBT	40	41	103%	0	75	50	D
NBR	100	98	98%	0	50	5	A
NB	**270**	**269**	**100%**			**34**	**C**
SBL	140	139	99%	50	250	69	E
SBT	30	30	100%	0	75	59	E
SBR	170	166	98%	0	50	6	A
SB	**340**	**335**	**99%**			**37**	**D**
EBL	340	344	101%	75	225	68	E
EBT	930	929	100%	50	350	18	B
EBR	250	252	101%	50	350	7	A
EB	**1,520**	**1,525**	**100%**			**28**	**C**
WBL	20	21	105%	0	50	71	E
WBT	1,140	1,140	100%	50	275	20	B
WBR	70	68	97%	75	300	18	B
WB	**1,230**	**1,229**	**100%**			**21**	**C**
Total	**3,360**	**3,358**	**100%**			**26**	**C**

Node Letter: TB VISSIM ID: 3300

LOS Category: Signalized

4: Hamilton View — Delay / LOS

Mvmt	Demand	Volume Served	% Served	Queue (ft) Avg / 95th 900-4500		Analysis Period 900-4500	
NBL	370	363	98%	250	750	160	F
NBT	320	328	103%	50	200	51	D
NBR	240	230	96%	0	100	10	A
NB	**930**	**921**	**99%**			**84**	**F**
SBL	130	125	96%	25	125	88	F
SBT	470	464	99%	250	1,000	86	F
SBR	340	343	101%	275	1,025	74	E
SB	**940**	**932**	**99%**			**82**	**F**
EBL	180	180	100%	50	150	69	E
EBT	560	560	100%	50	175	22	C
EBR	430	423	98%	50	225	17	B
EB	**1,170**	**1,163**	**99%**			**28**	**C**
WBL	420	419	100%	100	275	66	E
WBT	520	522	100%	50	250	29	C
WBR	100	97	97%	50	250	23	C
WB	**1,040**	**1,038**	**100%**			**44**	**D**
Total	**4,080**	**4,054**	**99%**			**57**	**E**

Node Letter: TC VISSIM ID: 3400

2050BldSPUIPM_3NBL+ ChoiceLn

LOS Category: Signalized

3: Market Center — Delay / LOS

Mvmt	Demand	Volume Served	% Served	Queue (ft) Avg / 95th 900-4500		Analysis Period 900-4500	
NBL	130	130	100%	50	200	51	D
NBT	40	41	103%	0	75	50	D
NBR	100	98	98%	0	50	5	A
NB	**270**	**269**	**100%**			**34**	**C**
SBL	140	139	99%	50	250	68	E
SBT	30	30	100%	0	75	59	E
SBR	170	166	98%	0	50	6	A
SB	**340**	**335**	**99%**			**36**	**D**
EBL	340	344	101%	75	225	68	E
EBT	930	930	100%	50	350	17	B
EBR	250	251	100%	50	350	7	A
EB	**1,520**	**1,525**	**100%**			**27**	**C**
WBL	20	21	105%	0	50	70	E
WBT	1,140	1,138	100%	50	300	20	B
WBR	70	68	97%	75	300	17	B
WB	**1,230**	**1,227**	**100%**			**21**	**B**
Total	**3,360**	**3,356**	**100%**			**26**	**C**

Node Letter: TB VISSIM ID: 3300

LOS Category: Signalized

4: Hamilton View — Delay / LOS

Mvmt	Demand	Volume Served	% Served	Queue (ft) Avg / 95th 900-4500		Analysis Period 900-4500	
NBL	370	364	98%	250	725	159	F
NBT	320	328	103%	50	200	50	D
NBR	240	230	96%	0	100	10	A
NB	**930**	**922**	**99%**			**83**	**F**
SBL	130	125	96%	25	125	93	F
SBT	470	462	98%	275	1,050	91	F
SBR	340	341	100%	275	1,050	76	E
SB	**940**	**928**	**99%**			**86**	**F**
EBL	180	180	100%	50	150	68	E
EBT	560	560	100%	50	175	22	C
EBR	430	422	98%	25	225	16	B
EB	**1,170**	**1,162**	**99%**			**27**	**C**
WBL	420	419	100%	100	275	66	E
WBT	520	522	100%	50	250	29	C
WBR	100	97	97%	50	250	23	C
WB	**1,040**	**1,038**	**100%**			**44**	**D**
Total	**4,080**	**4,050**	**99%**			**57**	**E**

Node Letter: TC VISSIM ID: 3400

Appendix E. Final Concept Analysis Vissim Node Results

2050BldAM_EBChoiceLn_FinalVol

LOS Category: Signalized

1: 13400S — Delay / LOS

Mvmt	Demand	Volume Served	% Served	Queue (ft) Avg / 95th 900-4500		Analysis Period 900-4500	
NBL	1,270	1,241	98%	275	775	94	F
NBR	330	346	105%	0	0	23	C
NB	**1,600**	**1,587**	**99%**			**79**	**E**
SBL	240	238	99%	50	150	50	D
SBR	850	859	101%	50	275	21	C
SB	**1,090**	**1,097**	**101%**			**27**	**C**
EBL	1,320	1,266	96%	300	900	57	E
EBT	600	546	91%	100	500	41	D
EBR	1,530	1,466	96%	0	0	12	B
EB	**3,450**	**3,278**	**95%**			**35**	**C**
WBL	80	81	101%	25	75	63	E
WBT	510	508	100%	150	525	88	F
WBR	360	358	99%	0	0	4	A
WB	**950**	**947**	**100%**			**54**	**D**
Total	**7,090**	**6,909**	**97%**			**46**	**D**

Node Letter: T VISSIM ID: 134

LOS Category: Signalized

2: 4050W — Delay / LOS

Mvmt	Demand	Volume Served	% Served	Queue (ft) Avg / 95th 900-4500		Analysis Period 900-4500	
NBL	270	224	83%	2,125	2,750	484	F
NBT	50	40	80%	2,150	2,725	478	F
NBR	300	246	82%	2,175	2,750	448	F
NB	**620**	**510**	**82%**			**465**	**F**
SBL	120	119	99%	50	175	72	E
SBT	20	21	105%	0	50	54	D
SBR	30	30	100%	0	25	5	A
SB	**170**	**170**	**100%**			**58**	**E**
EBL	100	97	97%	25	150	141	F
EBT	3,030	2,919	96%	2,025	4,275	126	F
EBR	260	250	96%	0	100	126	F
EB	**3,390**	**3,266**	**96%**			**126**	**F**
WBL	180	183	102%	75	325	77	E
WBT	2,210	2,186	99%	100	675	20	B
WBR	240	234	98%	25	175	21	C
WB	**2,630**	**2,603**	**99%**			**24**	**C**
Total	**6,810**	**6,549**	**96%**			**110**	**F**

Node Letter: TA VISSIM ID: 3200

2050BldAM_FinalConcept_FinalVol

LOS Category: Signalized

1: 13400S — Delay / LOS

Mvmt	Demand	Volume Served	% Served	Queue (ft) Avg / 95th 900-4500		Analysis Period 900-4500	
NBL	1,270	1,241	98%	250	750	91	F
NBR	330	346	105%	0	0	23	C
NB	**1,600**	**1,587**	**99%**			**76**	**E**
SBL	240	236	98%	75	300	54	D
SBR	850	859	101%	50	275	21	C
SB	**1,090**	**1,095**	**100%**			**28**	**C**
EBL	1,320	1,252	95%	250	775	52	D
EBT	600	538	90%	125	875	41	D
EBR	1,530	1,447	95%	0	0	10	A
EB	**3,450**	**3,237**	**94%**			**31**	**C**
WBL	80	81	101%	25	125	61	E
WBT	510	508	100%	175	525	91	F
WBR	360	356	99%	0	0	3	A
WB	**950**	**945**	**99%**			**56**	**D**
Total	**7,090**	**6,864**	**97%**			**44**	**D**

Node Letter: T VISSIM ID: 134

LOS Category: Signalized

2: 4050W — Delay / LOS

Mvmt	Demand	Volume Served	% Served	Queue (ft) Avg / 95th 900-4500		Analysis Period 900-4500	
NBL	270	220	81%	2,275	2,750	511	F
NBT	50	39	78%	2,250	2,725	517	F
NBR	300	245	82%	2,275	2,750	483	F
NB	**620**	**504**	**81%**			**498**	**F**
SBL	120	120	100%	50	175	69	E
SBT	20	21	105%	0	50	54	D
SBR	30	30	100%	0	25	5	A
SB	**170**	**171**	**101%**			**56**	**E**
EBL	100	96	96%	25	150	163	F
EBT	3,030	2,878	95%	2,375	4,400	149	F
EBR	260	246	95%	0	125	147	F
EB	**3,390**	**3,220**	**95%**			**150**	**F**
WBL	180	184	102%	75	325	78	E
WBT	2,210	2,184	99%	100	675	19	B
WBR	240	235	98%	25	175	20	B
WB	**2,630**	**2,603**	**99%**			**24**	**C**
Total	**6,810**	**6,498**	**95%**			**124**	**F**

Node Letter: TA VISSIM ID: 3200

2050BldPM_EBChoiceLn_FinalVol

LOS Category: Signalized

1: 13400S — Delay / LOS

Mvmt	Demand	Volume Served	% Served	Queue (ft) Avg / 95th 900-4500		Analysis Period 900-4500	
NBL	1,410	1,367	97%	150	500	62	E
NBR	300	302	101%	0	0	21	C
NB	**1,710**	**1,669**	**98%**			**54**	**D**
SBL	400	408	102%	50	200	39	D
SBR	1,150	1,164	101%	175	600	45	D
SB	**1,550**	**1,572**	**101%**			**43**	**D**
EBL	920	880	96%	150	600	46	D
EBT	740	690	93%	75	500	27	C
EBR	1,350	1,303	97%	0	0	11	B
EB	**3,010**	**2,873**	**95%**			**26**	**C**
WBL	170	165	97%	50	150	103	F
WBT	820	797	97%	375	825	121	F
WBR	440	436	99%	0	0	20	B
WB	**1,430**	**1,398**	**98%**			**87**	**F**
Total	**7,700**	**7,512**	**98%**			**47**	**D**

Node Letter: T VISSIM ID: 134

LOS Category: Signalized

2: 4050W — Delay / LOS

Mvmt	Demand	Volume Served	% Served	Queue (ft) Avg / 95th 900-4500		Analysis Period 900-4500	
NBL	190	192	101%	100	475	90	F
NBT	50	47	94%	50	275	66	E
NBR	180	179	99%	75	325	44	D
NB	**420**	**418**	**100%**			**67**	**E**
SBL	280	281	100%	350	1,400	145	F
SBT	90	94	104%	25	125	80	E
SBR	200	198	99%	25	200	48	D
SB	**570**	**573**	**101%**			**101**	**F**
EBL	70	68	97%	25	125	174	F
EBT	2,550	2,410	95%	1,975	3,775	171	F
EBR	280	262	94%	25	150	172	F
EB	**2,900**	**2,740**	**94%**			**172**	**F**
WBL	320	319	100%	175	675	85	F
WBT	2,860	2,818	99%	175	1,075	20	B
WBR	200	192	96%	0	125	19	B
WB	**3,380**	**3,329**	**98%**			**26**	**C**
Total	**7,270**	**7,060**	**97%**			**91**	**F**

Node Letter: TA VISSIM ID: 3200

2050BldPM_FinalConcept_FinalVol

LOS Category: Signalized

1: 13400S — Delay / LOS

Mvmt	Demand	Volume Served	% Served	Queue (ft) Avg / 95th 900-4500		Analysis Period 900-4500	
NBL	1,410	1,368	97%	150	500	63	E
NBR	300	303	101%	0	0	22	C
NB	**1,710**	**1,671**	**98%**			**55**	**D**
SBL	400	408	102%	100	450	45	D
SBR	1,150	1,162	101%	175	550	40	D
SB	**1,550**	**1,570**	**101%**			**41**	**D**
EBL	920	875	95%	125	625	43	D
EBT	740	683	92%	100	725	25	C
EBR	1,350	1,292	96%	0	0	10	A
EB	**3,010**	**2,850**	**95%**			**24**	**C**
WBL	170	168	99%	100	325	100	F
WBT	820	804	98%	350	800	116	F
WBR	440	438	100%	0	0	15	B
WB	**1,430**	**1,410**	**99%**			**82**	**F**
Total	**7,700**	**7,501**	**97%**			**46**	**D**

Node Letter: T VISSIM ID: 134

LOS Category: Signalized

2: 4050W — Delay / LOS

Mvmt	Demand	Volume Served	% Served	Queue (ft) Avg / 95th 900-4500		Analysis Period 900-4500	
NBL	190	192	101%	100	475	89	F
NBT	50	47	94%	50	300	67	E
NBR	180	180	100%	75	325	44	D
NB	**420**	**419**	**100%**			**68**	**E**
SBL	280	282	101%	300	1,250	134	F
SBT	90	94	104%	25	150	75	E
SBR	200	199	100%	25	200	41	D
SB	**570**	**575**	**101%**			**92**	**F**
EBL	70	66	94%	25	125	195	F
EBT	2,550	2,387	94%	2,225	4,300	192	F
EBR	280	261	93%	25	150	191	F
EB	**2,900**	**2,714**	**94%**			**192**	**F**
WBL	320	320	100%	175	525	83	F
WBT	2,860	2,821	99%	150	925	19	B
WBR	200	193	97%	0	125	18	B
WB	**3,380**	**3,334**	**99%**			**25**	**C**
Total	**7,270**	**7,042**	**97%**			**98**	**F**

Node Letter: TA VISSIM ID: 3200

2050BldAM_EBChoiceLn_FinalVol

LOS Category: Signalized

3: Market Center — Delay / LOS

Mvmt	Demand	Volume Served	% Served	Queue (ft) Avg / 95th 900-4500		Analysis Period 900-4500	
NBL	60	60	100%	0	75	25	C
NBT	10	10	100%	0	25	25	C
NBR	30	30	100%	0	25	5	A
NB	**100**	**100**	**100%**			**19**	**B**
SBL	40	40	100%	0	50	26	C
SBT	10	10	100%	0	25	26	C
SBR	110	107	97%	0	50	5	A
SB	**160**	**157**	**98%**			**12**	**B**
EBL	290	284	98%	25	150	26	C
EBT	760	734	97%	25	200	7	A
EBR	120	116	97%	0	200	4	A
EB	**1,170**	**1,134**	**97%**			**12**	**B**
WBL	20	21	105%	0	50	28	C
WBT	780	777	100%	25	150	12	B
WBR	70	65	93%	25	150	10	A
WB	**870**	**863**	**99%**			**12**	**B**
Total	**2,300**	**2,254**	**98%**			**12**	**B**

Node Letter: TB VISSIM ID: 3300

LOS Category: Signalized

4: Hamilton View — Delay / LOS

Mvmt	Demand	Volume Served	% Served	Queue (ft) Avg / 95th 900-4500		Analysis Period 900-4500	
NBL	340	333	98%	50	150	35	C
NBT	240	245	102%	25	100	25	C
NBR	100	99	99%	0	50	4	A
NB	**680**	**677**	**100%**			**27**	**C**
SBL	60	59	98%	0	50	40	D
SBT	160	160	100%	25	150	33	C
SBR	140	140	100%	25	150	18	B
SB	**360**	**359**	**100%**			**28**	**C**
EBL	130	124	95%	25	100	40	D
EBT	500	478	96%	25	200	22	C
EBR	200	199	100%	0	125	8	A
EB	**830**	**801**	**97%**			**22**	**C**
WBL	120	119	99%	25	100	39	D
WBT	390	390	100%	25	200	24	C
WBR	70	71	101%	50	200	16	B
WB	**580**	**580**	**100%**			**26**	**C**
Total	**2,450**	**2,417**	**99%**			**25**	**C**

Node Letter: TC VISSIM ID: 3400

2050BldAM_FinalConcept_FinalVol

LOS Category: Signalized

3: Market Center — Delay / LOS

Mvmt	Demand	Volume Served	% Served	Queue (ft) Avg / 95th 900-4500		Analysis Period 900-4500	
NBL	60	59	98%	0	75	24	C
NBT	10	10	100%	0	25	27	C
NBR	30	30	100%	0	25	5	A
NB	**100**	**99**	**99%**			**19**	**B**
SBL	40	40	100%	0	50	27	C
SBT	10	10	100%	0	25	24	C
SBR	110	107	97%	0	50	5	A
SB	**160**	**157**	**98%**			**12**	**B**
EBL	290	282	97%	25	125	26	C
EBT	760	727	96%	0	200	7	A
EBR	120	115	96%	0	200	3	A
EB	**1,170**	**1,124**	**96%**			**11**	**B**
WBL	20	21	105%	0	50	32	C
WBT	780	777	100%	25	175	12	B
WBR	70	64	91%	25	175	10	A
WB	**870**	**862**	**99%**			**13**	**B**
Total	**2,300**	**2,242**	**97%**			**12**	**B**

Node Letter: TB VISSIM ID: 3300

LOS Category: Signalized

4: Hamilton View — Delay / LOS

Mvmt	Demand	Volume Served	% Served	Queue (ft) Avg / 95th 900-4500		Analysis Period 900-4500	
NBL	340	334	98%	50	150	35	C
NBT	240	246	103%	25	100	25	C
NBR	100	100	100%	0	50	5	A
NB	**680**	**680**	**100%**			**27**	**C**
SBL	60	59	98%	0	50	40	D
SBT	160	160	100%	25	150	34	C
SBR	140	139	99%	25	150	17	B
SB	**360**	**358**	**99%**			**29**	**C**
EBL	130	124	95%	25	100	41	D
EBT	500	476	95%	25	200	22	C
EBR	200	198	99%	0	100	8	A
EB	**830**	**798**	**96%**			**22**	**C**
WBL	120	119	99%	25	100	40	D
WBT	390	390	100%	25	175	23	C
WBR	70	71	101%	25	175	16	B
WB	**580**	**580**	**100%**			**25**	**C**
Total	**2,450**	**2,416**	**99%**			**25**	**C**

Node Letter: TC VISSIM ID: 3400

2050BldPM_EBChoiceLn_FinalVol

LOS Category: Signalized

3: Market Center — Delay / LOS

Mvmt	Demand	Volume Served	% Served	Queue (ft) Avg / 95th 900-4500		Analysis Period 900-4500	
NBL	120	120	100%	25	175	51	D
NBT	40	40	100%	0	75	48	D
NBR	90	88	98%	0	50	5	A
NB	**250**	**248**	**99%**			**34**	**C**
SBL	140	140	100%	50	225	67	E
SBT	30	30	100%	0	75	64	E
SBR	160	157	98%	0	50	6	A
SB	**330**	**327**	**99%**			**37**	**D**
EBL	320	313	98%	75	225	71	E
EBT	870	848	97%	50	325	16	B
EBR	250	240	96%	50	325	7	A
EB	**1,440**	**1,401**	**97%**			**27**	**C**
WBL	20	21	105%	0	50	68	E
WBT	1,150	1,153	100%	75	375	27	C
WBR	80	80	100%	75	375	24	C
WB	**1,250**	**1,254**	**100%**			**28**	**C**
Total	**3,270**	**3,230**	**99%**			**29**	**C**

Node Letter: TB VISSIM ID: 3300

LOS Category: Signalized

4: Hamilton View — Delay / LOS

Mvmt	Demand	Volume Served	% Served	Queue (ft) Avg / 95th 900-4500		Analysis Period 900-4500	
NBL	350	347	99%	150	550	120	F
NBT	320	327	102%	50	200	48	D
NBR	280	273	98%	0	100	8	A
NB	**950**	**947**	**100%**			**63**	**E**
SBL	160	156	98%	50	125	99	F
SBT	450	442	98%	300	1,250	94	F
SBR	340	343	101%	300	1,250	85	F
SB	**950**	**941**	**99%**			**91**	**F**
EBL	160	158	99%	50	125	72	E
EBT	580	569	98%	25	175	20	B
EBR	360	345	96%	25	175	12	B
EB	**1,100**	**1,072**	**97%**			**25**	**C**
WBL	450	450	100%	100	300	66	E
WBT	560	565	101%	50	275	29	C
WBR	120	114	95%	50	275	24	C
WB	**1,130**	**1,129**	**100%**			**43**	**D**
Total	**4,130**	**4,089**	**99%**			**54**	**D**

Node Letter: TC VISSIM ID: 3400

2050BldPM_FinalConcept_FinalVol

LOS Category: Signalized

3: Market Center — Delay / LOS

Mvmt	Demand	Volume Served	% Served	Queue (ft) Avg / 95th 900-4500		Analysis Period 900-4500	
NBL	120	120	100%	25	200	52	D
NBT	40	40	100%	0	75	47	D
NBR	90	88	98%	0	50	5	A
NB	**250**	**248**	**99%**			**34**	**C**
SBL	140	141	101%	50	225	68	E
SBT	30	30	100%	0	75	65	E
SBR	160	157	98%	0	50	6	A
SB	**330**	**328**	**99%**			**38**	**D**
EBL	320	310	97%	75	200	71	E
EBT	870	843	97%	50	350	17	B
EBR	250	239	96%	50	350	7	A
EB	**1,440**	**1,392**	**97%**			**27**	**C**
WBL	20	21	105%	0	50	69	E
WBT	1,150	1,160	101%	75	350	25	C
WBR	80	80	100%	75	350	23	C
WB	**1,250**	**1,261**	**101%**			**25**	**C**
Total	**3,270**	**3,229**	**99%**			**28**	**C**

Node Letter: TB VISSIM ID: 3300

LOS Category: Signalized

4: Hamilton View — Delay / LOS

Mvmt	Demand	Volume Served	% Served	Queue (ft) Avg / 95th 900-4500		Analysis Period 900-4500	
NBL	350	349	100%	150	500	110	F
NBT	320	327	102%	50	200	47	D
NBR	280	273	98%	0	100	8	A
NB	**950**	**949**	**100%**			**59**	**E**
SBL	160	157	98%	50	125	80	E
SBT	450	444	99%	200	650	72	E
SBR	340	347	102%	225	650	63	E
SB	**950**	**948**	**100%**			**70**	**E**
EBL	160	158	99%	50	125	72	E
EBT	580	567	98%	25	175	20	B
EBR	360	345	96%	25	175	12	B
EB	**1,100**	**1,070**	**97%**			**25**	**C**
WBL	450	450	100%	100	300	66	E
WBT	560	565	101%	50	275	29	C
WBR	120	114	95%	75	275	24	C
WB	**1,130**	**1,129**	**100%**			**43**	**D**
Total	**4,130**	**4,096**	**99%**			**48**	**D**

Node Letter: TC VISSIM ID: 3400

Appendix F. Volume Sensitivity Test Analysis Vissim Node Results

Bangerter 12 Interchanges - 13400S

VISSIM Volume, Queue, and Delay Results

2050AM_Final Concept

LOS Category: Signalized

1: 13400S						Delay / LOS	
		Volume		Queue (ft) Avg / 95th		Analysis Period	
Mvmt	Demand	Served	% Served	900-4500		900-4500	
NBL	1,270	1,241	98%	250	750	91	F
NBR	330	346	105%	0	0	23	C
NB	**1,600**	**1,587**	**99%**			**76**	**E**
SBL	240	236	98%	75	300	54	D
SBR	850	859	101%	50	275	21	C
SB	**1,090**	**1,095**	**100%**			**28**	**C**
EBL	1,320	1,252	95%	250	775	52	D
EBT	600	538	90%	125	875	41	D
EBR	1,530	1,447	95%	0	0	10	A
EB	**3,450**	**3,237**	**94%**			**31**	**C**
WBL	80	81	101%	25	125	61	E
WBT	510	508	100%	175	525	91	F
WBR	360	356	99%	0	0	3	A
WB	**950**	**945**	**99%**			**56**	**D**
Total	**7,090**	**6,864**	**97%**			**44**	**D**

Node Letter: T VISSIM ID: 134

LOS Category: Signalized

2: 4050W						Delay / LOS	
		Volume		Queue (ft) Avg / 95th		Analysis Period	
Mvmt	Demand	Served	% Served	900-4500		900-4500	
NBL	270	220	81%	2,275	2,750	511	F
NBT	50	39	78%	2,250	2,725	517	F
NBR	300	245	82%	2,275	2,750	483	F
NB	**620**	**504**	**81%**			**498**	**F**
SBL	120	120	100%	50	175	69	E
SBT	20	21	105%	0	50	54	D
SBR	30	30	100%	0	25	5	A
SB	**170**	**171**	**101%**			**56**	**E**
EBL	100	96	96%	25	150	163	F
EBT	3,030	2,878	95%	2,375	4,400	149	F
EBR	260	246	95%	0	125	147	F
EB	**3,390**	**3,220**	**95%**			**150**	**F**
WBL	180	184	102%	75	325	78	E
WBT	2,210	2,184	99%	100	675	19	B
WBR	240	235	98%	25	175	20	B
WB	**2,630**	**2,603**	**99%**			**24**	**C**
Total	**6,810**	**6,498**	**95%**			**124**	**F**

Node Letter: TA VISSIM ID: 3200

2050AM_Sensitivity Test

LOS Category: Signalized

1: 13400S						Delay / LOS	
		Volume		Queue (ft) Avg / 95th		Analysis Period	
Mvmt	Demand	Served	% Served	900-4500		900-4500	
NBL	1,430	1,411	99%	275	750	87	F
NBR	280	293	105%	0	0	28	C
NB	**1,710**	**1,704**	**100%**			**77**	**E**
SBL	210	208	99%	50	275	48	D
SBR	980	999	102%	100	400	29	C
SB	**1,190**	**1,207**	**101%**			**32**	**C**
EBL	1,430	1,318	92%	375	1,075	71	E
EBT	550	478	87%	100	900	43	D
EBR	1,690	1,524	90%	0	0	11	B
EB	**3,670**	**3,320**	**90%**			**39**	**D**
WBL	60	61	102%	25	125	67	E
WBT	470	460	98%	150	400	89	F
WBR	280	278	99%	0	0	3	A
WB	**810**	**799**	**99%**			**57**	**E**
Total	**7,380**	**7,030**	**95%**			**49**	**D**

Node Letter: T VISSIM ID: 134

LOS Category: Signalized

2: 4050W						Delay / LOS	
		Volume		Queue (ft) Avg / 95th		Analysis Period	
Mvmt	Demand	Served	% Served	900-4500		900-4500	
NBL	280	236	84%	2,025	2,750	447	F
NBT	40	32	80%	2,025	2,725	436	F
NBR	300	252	84%	2,050	2,750	417	F
NB	**620**	**520**	**84%**			**431**	**F**
SBL	120	119	99%	50	200	78	E
SBT	10	12	120%	0	25	52	D
SBR	20	18	90%	0	25	5	A
SB	**150**	**149**	**99%**			**67**	**E**
EBL	100	93	93%	25	150	220	F
EBT	3,250	2,916	90%	3,300	4,400	206	F
EBR	250	224	90%	0	100	204	F
EB	**3,600**	**3,233**	**90%**			**206**	**F**
WBL	170	168	99%	200	675	168	F
WBT	2,460	2,466	100%	150	900	20	B
WBR	250	246	98%	25	150	20	B
WB	**2,880**	**2,880**	**100%**			**29**	**C**
Total	**7,250**	**6,782**	**94%**			**145**	**F**

Node Letter: TA VISSIM ID: 3200

2050PM_Final Concept

LOS Category: Signalized

1: 13400S						Delay / LOS	
		Volume		Queue (ft) Avg / 95th		Analysis Period	
Mvmt	Demand	Served	% Served	900-4500		900-4500	
NBL	1,410	1,368	97%	150	500	63	E
NBR	300	303	101%	0	0	22	C
NB	**1,710**	**1,671**	**98%**			**55**	**D**
SBL	400	408	102%	100	450	45	D
SBR	1,150	1,162	101%	175	550	40	D
SB	**1,550**	**1,570**	**101%**			**41**	**D**
EBL	920	875	95%	125	625	43	D
EBT	740	683	92%	100	725	25	C
EBR	1,350	1,292	96%	0	0	10	A
EB	**3,010**	**2,850**	**95%**			**24**	**C**
WBL	170	168	99%	100	325	100	F
WBT	820	804	98%	350	800	116	F
WBR	440	438	100%	0	0	15	B
WB	**1,430**	**1,410**	**99%**			**82**	**F**
Total	**7,700**	**7,501**	**97%**			**46**	**D**

Node Letter: T VISSIM ID: 134

LOS Category: Signalized

2: 4050W						Delay / LOS	
		Volume		Queue (ft) Avg / 95th		Analysis Period	
Mvmt	Demand	Served	% Served	900-4500		900-4500	
NBL	190	192	101%	100	475	89	F
NBT	50	47	94%	50	300	67	E
NBR	180	180	100%	75	325	44	D
NB	**420**	**419**	**100%**			**68**	**E**
SBL	280	282	101%	300	1,250	134	F
SBT	90	94	104%	25	150	75	E
SBR	200	199	100%	25	200	41	D
SB	**570**	**575**	**101%**			**92**	**F**
EBL	70	66	94%	25	125	195	F
EBT	2,550	2,387	94%	2,225	4,300	192	F
EBR	280	261	93%	25	150	191	F
EB	**2,900**	**2,714**	**94%**			**192**	**F**
WBL	320	320	100%	175	525	83	F
WBT	2,860	2,821	99%	150	925	19	B
WBR	200	193	97%	0	125	18	B
WB	**3,380**	**3,334**	**99%**			**25**	**C**
Total	**7,270**	**7,042**	**97%**			**98**	**F**

Node Letter: TA VISSIM ID: 3200

2050PM_Sensitivity Test

LOS Category: Signalized

1: 13400S						Delay / LOS	
		Volume		Queue (ft) Avg / 95th		Analysis Period	
Mvmt	Demand	Served	% Served	900-4500		900-4500	
NBL	1,490	1,477	99%	175	525	67	E
NBR	290	294	101%	0	0	24	C
NB	**1,780**	**1,771**	**99%**			**60**	**E**
SBL	370	385	104%	150	750	47	D
SBR	1,170	1,180	101%	200	825	47	D
SB	**1,540**	**1,565**	**102%**			**47**	**D**
EBL	970	901	93%	200	775	55	D
EBT	760	685	90%	100	875	26	C
EBR	1,490	1,390	93%	0	0	11	B
EB	**3,220**	**2,976**	**92%**			**28**	**C**
WBL	160	156	98%	75	250	74	E
WBT	780	780	100%	200	650	73	E
WBR	400	403	101%	0	0	5	A
WB	**1,340**	**1,339**	**100%**			**53**	**D**
Total	**7,880**	**7,651**	**97%**			**43**	**D**

Node Letter: T VISSIM ID: 134

LOS Category: Signalized

2: 4050W						Delay / LOS	
		Volume		Queue (ft) Avg / 95th		Analysis Period	
Mvmt	Demand	Served	% Served	900-4500		900-4500	
NBL	180	180	100%	275	1,150	173	F
NBT	40	37	93%	125	925	119	F
NBR	180	179	99%	150	950	92	F
NB	**400**	**396**	**99%**			**131**	**F**
SBL	270	251	93%	700	1,425	267	F
SBT	90	89	99%	50	175	146	F
SBR	200	185	93%	100	400	118	F
SB	**560**	**525**	**94%**			**194**	**F**
EBL	80	75	94%	25	125	234	F
EBT	2,770	2,555	92%	2,900	4,400	223	F
EBR	290	267	92%	25	150	222	F
EB	**3,140**	**2,897**	**92%**			**223**	**F**
WBL	310	312	101%	200	600	99	F
WBT	2,940	2,944	100%	125	925	17	B
WBR	190	183	96%	0	100	15	B
WB	**3,440**	**3,439**	**100%**			**24**	**C**
Total	**7,540**	**7,257**	**96%**			**122**	**F**

Node Letter: TA VISSIM ID: 3200

2050AM_Final Concept

LOS Category: Signalized

3: Market Center							Delay / LOS
		Volume		Queue (ft) Avg / 95th		Analysis Period	
Mvmt	Demand	Served	% Served	900-4500		900-4500	
NBL	60	59	98%	0	75	24	C
NBT	10	10	100%	0	25	27	C
NBR	30	30	100%	0	25	5	A
NB	**100**	**99**	**99%**			**19**	**B**
SBL	40	40	100%	0	50	27	C
SBT	10	10	100%	0	25	24	C
SBR	110	107	97%	0	50	5	A
SB	**160**	**157**	**98%**			**12**	**B**
EBL	290	282	97%	25	125	26	C
EBT	760	727	96%	0	200	7	A
EBR	120	115	96%	0	200	3	A
EB	**1,170**	**1,124**	**96%**			**11**	**B**
WBL	20	21	105%	0	50	32	C
WBT	780	777	100%	25	175	12	B
WBR	70	64	91%	25	175	10	A
WB	**870**	**862**	**99%**			**13**	**B**
Total	**2,300**	**2,242**	**97%**			**12**	**B**

Node Letter: TB VISSIM ID: 3300

LOS Category: Signalized

4: Hamilton View							Delay / LOS
		Volume		Queue (ft) Avg / 95th		Analysis Period	
Mvmt	Demand	Served	% Served	900-4500		900-4500	
NBL	340	334	98%	50	150	35	C
NBT	240	246	103%	25	100	25	C
NBR	100	100	100%	0	50	5	A
NB	**680**	**680**	**100%**			**27**	**C**
SBL	60	59	98%	0	50	40	D
SBT	160	160	100%	25	150	34	C
SBR	140	139	99%	25	150	17	B
SB	**360**	**358**	**99%**			**29**	**C**
EBL	130	124	95%	25	100	41	D
EBT	500	476	95%	25	200	22	C
EBR	200	198	99%	0	100	8	A
EB	**830**	**798**	**96%**			**22**	**C**
WBL	120	119	99%	25	100	40	D
WBT	390	390	100%	25	175	23	C
WBR	70	71	101%	25	175	16	B
WB	**580**	**580**	**100%**			**25**	**C**
Total	**2,450**	**2,416**	**99%**			**25**	**C**

Node Letter: TC VISSIM ID: 3400

2050AM_Sensitivity Test

LOS Category: Signalized

3: Market Center							Delay / LOS
		Volume		Queue (ft) Avg / 95th		Analysis Period	
Mvmt	Demand	Served	% Served	900-4500		900-4500	
NBL	60	60	100%	0	75	24	C
NBT	20	19	95%	0	25	24	C
NBR	30	30	100%	0	25	5	A
NB	**110**	**109**	**99%**			**19**	**B**
SBL	40	38	95%	0	50	25	C
SBT	10	10	100%	0	25	27	C
SBR	110	108	98%	0	50	5	A
SB	**160**	**156**	**98%**			**11**	**B**
EBL	280	266	95%	25	125	24	C
EBT	630	594	94%	0	150	6	A
EBR	130	124	95%	0	150	3	A
EB	**1,040**	**984**	**95%**			**11**	**A**
WBL	20	22	110%	0	50	27	C
WBT	640	640	100%	25	150	13	B
WBR	70	67	96%	25	150	9	A
WB	**730**	**729**	**100%**			**13**	**B**
Total	**2,040**	**1,978**	**97%**			**12**	**B**

Node Letter: TB VISSIM ID: 3300

LOS Category: Signalized

4: Hamilton View							Delay / LOS
		Volume		Queue (ft) Avg / 95th		Analysis Period	
Mvmt	Demand	Served	% Served	900-4500		900-4500	
NBL	190	191	101%	25	100	33	C
NBT	200	200	100%	25	100	27	C
NBR	100	98	98%	0	50	5	A
NB	**490**	**489**	**100%**			**25**	**C**
SBL	100	99	99%	25	75	36	D
SBT	100	101	101%	25	125	31	C
SBR	140	140	100%	25	125	13	B
SB	**340**	**340**	**100%**			**25**	**C**
EBL	120	109	91%	25	75	36	D
EBT	500	472	94%	25	175	18	B
EBR	80	79	99%	0	50	6	A
EB	**700**	**660**	**94%**			**19**	**B**
WBL	80	84	105%	25	75	36	D
WBT	400	401	100%	25	175	19	B
WBR	110	107	97%	25	175	13	B
WB	**590**	**592**	**100%**			**21**	**C**
Total	**2,120**	**2,081**	**98%**			**22**	**C**

Node Letter: TC VISSIM ID: 3400

2050PM_Final Concept

LOS Category: Signalized

3: Market Center							Delay / LOS
		Volume		Queue (ft) Avg / 95th		Analysis Period	
Mvmt	Demand	Served	% Served	900-4500		900-4500	
NBL	120	120	100%	25	200	52	D
NBT	40	40	100%	0	75	47	D
NBR	90	88	98%	0	50	5	A
NB	**250**	**248**	**99%**			**34**	**C**
SBL	140	141	101%	50	225	68	E
SBT	30	30	100%	0	75	65	E
SBR	160	157	98%	0	50	6	A
SB	**330**	**328**	**99%**			**38**	**D**
EBL	320	310	97%	75	200	71	E
EBT	870	843	97%	50	350	17	B
EBR	250	239	96%	50	350	7	A
EB	**1,440**	**1,392**	**97%**			**27**	**C**
WBL	20	21	105%	0	50	69	E
WBT	1,150	1,160	101%	75	350	25	C
WBR	80	80	100%	75	350	23	C
WB	**1,250**	**1,261**	**101%**			**25**	**C**
Total	**3,270**	**3,229**	**99%**			**28**	**C**

Node Letter: TB VISSIM ID: 3300

LOS Category: Signalized

4: Hamilton View							Delay / LOS
		Volume		Queue (ft) Avg / 95th		Analysis Period	
Mvmt	Demand	Served	% Served	900-4500		900-4500	
NBL	350	349	100%	150	500	110	F
NBT	320	327	102%	50	200	47	D
NBR	280	273	98%	0	100	8	A
NB	**950**	**949**	**100%**			**59**	**E**
SBL	160	157	98%	50	125	80	E
SBT	450	444	99%	200	650	72	E
SBR	340	347	102%	225	650	63	E
SB	**950**	**948**	**100%**			**70**	**E**
EBL	160	158	99%	50	125	72	E
EBT	580	567	98%	25	175	20	B
EBR	360	345	96%	25	175	12	B
EB	**1,100**	**1,070**	**97%**			**25**	**C**
WBL	450	450	100%	100	300	66	E
WBT	560	565	101%	50	275	29	C
WBR	120	114	95%	75	275	24	C
WB	**1,130**	**1,129**	**100%**			**43**	**D**
Total	**4,130**	**4,096**	**99%**			**48**	**D**

Node Letter: TC VISSIM ID: 3400

2050PM_Sensitivity Test

LOS Category: Signalized

3: Market Center							Delay / LOS
		Volume		Queue (ft) Avg / 95th		Analysis Period	
Mvmt	Demand	Served	% Served	900-4500		900-4500	
NBL	130	130	100%	50	200	51	D
NBT	40	40	100%	0	75	46	D
NBR	80	78	98%	0	50	5	A
NB	**250**	**248**	**99%**			**36**	**D**
SBL	130	130	100%	50	200	68	E
SBT	30	30	100%	0	75	60	E
SBR	180	176	98%	0	50	6	A
SB	**340**	**336**	**99%**			**35**	**C**
EBL	350	340	97%	75	225	72	E
EBT	820	789	96%	50	325	16	B
EBR	250	238	95%	50	325	7	A
EB	**1,420**	**1,367**	**96%**			**29**	**C**
WBL	20	21	105%	0	50	67	E
WBT	1,030	1,035	100%	50	275	22	C
WBR	60	59	98%	50	275	18	B
WB	**1,110**	**1,115**	**100%**			**22**	**C**
Total	**3,120**	**3,066**	**98%**			**27**	**C**

Node Letter: TB VISSIM ID: 3300

LOS Category: Signalized

4: Hamilton View							Delay / LOS
		Volume		Queue (ft) Avg / 95th		Analysis Period	
Mvmt	Demand	Served	% Served	900-4500		900-4500	
NBL	270	265	98%	75	200	73	E
NBT	290	297	102%	50	175	48	D
NBR	260	257	99%	0	100	6	A
NB	**820**	**819**	**100%**			**43**	**D**
SBL	180	179	99%	50	150	76	E
SBT	420	413	98%	175	550	66	E
SBR	330	336	102%	175	575	56	E
SB	**930**	**928**	**100%**			**64**	**E**
EBL	160	158	99%	50	150	72	E
EBT	580	566	98%	25	175	19	B
EBR	290	271	93%	0	125	9	A
EB	**1,030**	**995**	**97%**			**24**	**C**
WBL	390	390	100%	75	250	65	E
WBT	510	514	101%	50	275	28	C
WBR	130	126	97%	50	275	23	C
WB	**1,030**	**1,030**	**100%**			**41**	**D**
Total	**3,810**	**3,772**	**99%**			**43**	**D**

Node Letter: TC VISSIM ID: 3400

Appendix G. 2030 Build Analysis Vissim Node Results

2030AM_2NBL

LOS Category: Signalized

1: 13400S — Delay / LOS

Mvmt	Demand	Volume Served	% Served	Queue (ft) Avg / 95th 900-4500		Analysis Period 900-4500	
NBL	720	702	98%	150	500	92	F
NBR	290	290	100%	0	0	30	C
NB	**1,010**	**992**	**98%**			**74**	**E**
SBL	170	167	98%	25	125	52	D
SBR	390	397	102%	25	175	11	B
SB	**560**	**564**	**101%**			**23**	**C**
EBL	1,030	1,024	99%	175	575	48	D
EBT	430	403	94%	75	475	39	D
EBR	1,360	1,354	100%	0	0	11	B
EB	**2,820**	**2,781**	**99%**			**29**	**C**
WBL	80	82	103%	25	100	57	E
WBT	300	303	101%	75	225	65	E
WBR	340	334	98%	0	0	2	A
WB	**720**	**719**	**100%**			**35**	**C**
Total	**5,110**	**5,056**	**99%**			**38**	D

Node Letter: T VISSIM ID: 134

LOS Category: Signalized

2: 4050W — Delay / LOS

Mvmt	Demand	Volume Served	% Served	Queue (ft) Avg / 95th 900-4500		Analysis Period 900-4500	
NBL	250	219	88%	1,500	2,725	397	F
NBT	90	74	82%	1,425	2,725	388	F
NBR	200	176	88%	1,475	2,750	355	F
NB	**540**	**469**	**87%**			**380**	**F**
SBL	110	109	99%	50	175	79	E
SBT	30	30	100%	0	75	59	E
SBR	90	90	100%	0	25	3	A
SB	**230**	**229**	**100%**			**46**	**D**
EBL	240	239	100%	125	375	80	E
EBT	2,510	2,504	100%	200	825	21	C
EBR	230	226	98%	0	100	16	B
EB	**2,980**	**2,969**	**100%**			**25**	**C**
WBL	120	121	101%	50	200	69	E
WBT	1,130	1,110	98%	50	375	15	B
WBR	160	157	98%	25	125	18	B
WB	**1,410**	**1,388**	**98%**			**20**	**B**
Total	**5,160**	**5,055**	**98%**			**58**	E

Node Letter: TA VISSIM ID: 3200

2030AM_3NBL

LOS Category: Signalized

1: 13400S — Delay / LOS

Mvmt	Demand	Volume Served	% Served	Queue (ft) Avg / 95th 900-4500		Analysis Period 900-4500	
NBL	720	710	99%	125	350	91	F
NBR	290	290	100%	0	0	30	C
NB	**1,010**	**1,000**	**99%**			**74**	**E**
SBL	170	167	98%	25	150	57	E
SBR	390	394	101%	0	100	9	A
SB	**560**	**561**	**100%**			**23**	**C**
EBL	1,030	1,014	98%	150	650	41	D
EBT	430	400	93%	50	225	35	C
EBR	1,360	1,354	100%	0	0	15	B
EB	**2,820**	**2,768**	**98%**			**27**	**C**
WBL	80	82	103%	25	100	54	D
WBT	300	304	101%	75	225	65	E
WBR	340	334	98%	0	0	2	A
WB	**720**	**720**	**100%**			**34**	**C**
Total	**5,110**	**5,049**	**99%**			**37**	D

Node Letter: T VISSIM ID: 134

LOS Category: Signalized

2: 4050W — Delay / LOS

Mvmt	Demand	Volume Served	% Served	Queue (ft) Avg / 95th 900-4500		Analysis Period 900-4500	
NBL	250	212	85%	1,675	2,750	444	F
NBT	90	72	80%	1,675	2,725	447	F
NBR	200	171	86%	1,700	2,750	409	F
NB	**540**	**455**	**84%**			**432**	**F**
SBL	110	108	98%	50	175	77	E
SBT	30	30	100%	0	75	59	E
SBR	90	90	100%	0	50	3	A
SB	**230**	**228**	**99%**			**45**	**D**
EBL	240	239	100%	125	725	81	F
EBT	2,510	2,509	100%	500	1,375	34	C
EBR	230	226	98%	0	100	37	D
EB	**2,980**	**2,974**	**100%**			**38**	**D**
WBL	120	120	100%	50	200	68	E
WBT	1,130	1,107	98%	25	350	14	B
WBR	160	156	98%	0	125	16	B
WB	**1,410**	**1,383**	**98%**			**19**	**B**
Total	**5,160**	**5,040**	**98%**			**68**	E

Node Letter: TA VISSIM ID: 3200

2030PM_2NBL

LOS Category: Signalized

1: 13400S — Delay / LOS

Mvmt	Demand	Volume Served	% Served	Queue (ft) Avg / 95th 900-4500		Analysis Period 900-4500	
NBL	1,150	1,110	97%	200	650	84	F
NBR	260	250	96%	0	0	34	C
NB	**1,410**	**1,360**	**96%**			**75**	**E**
SBL	340	236	69%	2,150	7,725	782	F
SBR	930	624	67%	4,325	7,650	833	F
SB	**1,270**	**860**	**68%**			**818**	**F**
EBL	660	652	99%	125	425	56	E
EBT	480	464	97%	50	300	38	D
EBR	950	945	99%	0	0	4	A
EB	**2,090**	**2,061**	**99%**			**28**	**C**
WBL	180	176	98%	25	125	50	D
WBT	740	746	101%	100	375	40	D
WBR	470	468	100%	0	0	3	A
WB	**1,390**	**1,390**	**100%**			**29**	**C**
Total	**6,160**	**5,671**	**92%**			**159**	**F**

Node Letter: T VISSIM ID: 134

LOS Category: Signalized

2: 4050W — Delay / LOS

Mvmt	Demand	Volume Served	% Served	Queue (ft) Avg / 95th 900-4500		Analysis Period 900-4500	
NBL	150	151	101%	50	225	68	E
NBT	60	57	95%	50	275	58	E
NBR	150	149	99%	75	300	36	D
NB	**360**	**357**	**99%**			**53**	**D**
SBL	310	283	91%	950	1,425	272	F
SBT	90	88	98%	50	200	175	F
SBR	280	254	91%	25	250	126	F
SB	**680**	**625**	**92%**			**199**	**F**
EBL	190	193	102%	100	300	81	F
EBT	1,630	1,631	100%	100	575	20	B
EBR	250	244	98%	0	75	9	A
EB	**2,070**	**2,068**	**100%**			**24**	**C**
WBL	150	131	87%	75	200	84	F
WBT	2,450	2,158	88%	25	325	9	A
WBR	220	190	86%	0	100	10	A
WB	**2,820**	**2,479**	**88%**			**13**	**B**
Total	**5,930**	**5,529**	**93%**			**41**	D

Node Letter: TA VISSIM ID: 3200

2030PM_3NBL

LOS Category: Signalized

1: 13400S — Delay / LOS

Mvmt	Demand	Volume Served	% Served	Queue (ft) Avg / 95th 900-4500		Analysis Period 900-4500	
NBL	1,150	1,108	96%	100	375	74	E
NBR	260	250	96%	0	0	34	C
NB	**1,410**	**1,358**	**96%**			**66**	**E**
SBL	340	344	101%	50	175	39	D
SBR	930	944	102%	100	350	30	C
SB	**1,270**	**1,288**	**101%**			**32**	**C**
EBL	660	652	99%	100	400	51	D
EBT	480	464	97%	50	250	39	D
EBR	950	948	100%	0	0	6	A
EB	**2,090**	**2,064**	**99%**			**27**	**C**
WBL	180	175	97%	25	125	52	D
WBT	740	744	101%	125	475	51	D
WBR	470	466	99%	0	0	3	A
WB	**1,390**	**1,385**	**100%**			**35**	**C**
Total	**6,160**	**6,095**	**99%**			**39**	D

Node Letter: T VISSIM ID: 134

LOS Category: Signalized

2: 4050W — Delay / LOS

Mvmt	Demand	Volume Served	% Served	Queue (ft) Avg / 95th 900-4500		Analysis Period 900-4500	
NBL	150	151	101%	50	250	69	E
NBT	60	57	95%	50	275	58	E
NBR	150	149	99%	75	300	36	D
NB	**360**	**357**	**99%**			**54**	**D**
SBL	310	284	92%	975	1,425	273	F
SBT	90	88	98%	50	225	177	F
SBR	280	254	91%	125	1,425	138	F
SB	**680**	**626**	**92%**			**205**	**F**
EBL	190	193	102%	100	300	81	F
EBT	1,630	1,631	100%	125	775	21	C
EBR	250	244	98%	0	100	11	B
EB	**2,070**	**2,068**	**100%**			**25**	**C**
WBL	150	148	99%	75	225	76	E
WBT	2,450	2,435	99%	125	575	20	B
WBR	220	214	97%	25	125	19	B
WB	**2,820**	**2,797**	**99%**			**23**	**C**
Total	**5,930**	**5,848**	**99%**			**45**	D

Node Letter: TA VISSIM ID: 3200

2030AM_2NBL

LOS Category: Signalized

3: Market Center — Delay / LOS

Mvmt	Demand	Volume Served	% Served	Queue (ft) Avg / 95th 900-4500		Analysis Period 900-4500	
NBL	60	59	98%	0	75	22	C
NBT	20	19	95%	0	25	22	C
NBR	30	30	100%	0	25	5	A
NB	**110**	**108**	**98%**			**17**	**B**
SBL	30	30	100%	0	50	26	C
SBT	10	9	90%	0	25	23	C
SBR	80	80	100%	0	50	5	A
SB	**120**	**119**	**99%**			**11**	**B**
EBL	230	221	96%	25	100	23	C
EBT	560	552	99%	0	150	6	A
EBR	100	94	94%	0	150	3	A
EB	**890**	**867**	**97%**			**10**	**A**
WBL	20	21	105%	0	50	25	C
WBT	580	579	100%	25	125	11	B
WBR	70	64	91%	25	125	8	A
WB	**670**	**664**	**99%**			**11**	**B**
Total	**1,790**	**1,758**	**98%**			**11**	**B**

Node Letter: TB VISSIM ID: 3300

LOS Category: Signalized

4: Hamilton View — Delay / LOS

Mvmt	Demand	Volume Served	% Served	Queue (ft) Avg / 95th 900-4500		Analysis Period 900-4500	
NBL	220	216	98%	25	100	31	C
NBT	220	220	100%	25	100	24	C
NBR	90	93	103%	0	50	5	A
NB	**530**	**529**	**100%**			**24**	**C**
SBL	80	80	100%	25	75	35	C
SBT	100	102	102%	25	125	31	C
SBR	130	129	99%	25	125	13	B
SB	**310**	**311**	**100%**			**24**	**C**
EBL	120	118	98%	25	75	33	C
EBT	410	402	98%	25	150	18	B
EBR	90	94	104%	0	50	6	A
EB	**620**	**614**	**99%**			**19**	**B**
WBL	60	63	105%	0	75	34	C
WBT	320	320	100%	25	150	19	B
WBR	80	78	98%	25	150	12	B
WB	**460**	**461**	**100%**			**20**	**B**
Total	**1,920**	**1,915**	**100%**			**21**	**C**

Node Letter: TC VISSIM ID: 3400

2030AM_3NBL

LOS Category: Signalized

3: Market Center — Delay / LOS

Mvmt	Demand	Volume Served	% Served	Queue (ft) Avg / 95th 900-4500		Analysis Period 900-4500	
NBL	60	59	98%	0	75	22	C
NBT	20	19	95%	0	25	23	C
NBR	30	30	100%	0	25	5	A
NB	**110**	**108**	**98%**			**18**	**B**
SBL	30	31	103%	0	50	23	C
SBT	10	9	90%	0	25	21	C
SBR	80	80	100%	0	50	5	A
SB	**120**	**120**	**100%**			**11**	**A**
EBL	230	221	96%	25	125	23	C
EBT	560	550	98%	0	150	6	A
EBR	100	93	93%	0	150	3	A
EB	**890**	**864**	**97%**			**10**	**A**
WBL	20	21	105%	0	50	24	C
WBT	580	578	100%	25	150	11	B
WBR	70	65	93%	25	150	8	A
WB	**670**	**664**	**99%**			**11**	**B**
Total	**1,790**	**1,756**	**98%**			**11**	**B**

Node Letter: TB VISSIM ID: 3300

LOS Category: Signalized

4: Hamilton View — Delay / LOS

Mvmt	Demand	Volume Served	% Served	Queue (ft) Avg / 95th 900-4500		Analysis Period 900-4500	
NBL	220	215	98%	25	100	30	C
NBT	220	220	100%	25	100	25	C
NBR	90	93	103%	0	50	5	A
NB	**530**	**528**	**100%**			**24**	**C**
SBL	80	80	100%	0	50	34	C
SBT	100	102	102%	25	125	30	C
SBR	130	129	99%	25	125	12	B
SB	**310**	**311**	**100%**			**24**	**C**
EBL	120	118	98%	25	75	34	C
EBT	410	402	98%	25	150	17	B
EBR	90	94	104%	0	50	6	A
EB	**620**	**614**	**99%**			**19**	**B**
WBL	60	63	105%	0	75	34	C
WBT	320	320	100%	25	150	20	B
WBR	80	77	96%	25	175	14	B
WB	**460**	**460**	**100%**			**21**	**C**
Total	**1,920**	**1,913**	**100%**			**21**	**C**

Node Letter: TC VISSIM ID: 3400

2030PM_2NBL

LOS Category: Signalized

3: Market Center — Delay / LOS

Mvmt	Demand	Volume Served	% Served	Queue (ft) Avg / 95th 900-4500		Analysis Period 900-4500	
NBL	130	131	101%	50	175	51	D
NBT	40	40	100%	0	75	44	D
NBR	90	88	98%	0	50	5	A
NB	**260**	**259**	**100%**			**34**	**C**
SBL	110	111	101%	50	175	66	E
SBT	30	29	97%	0	50	58	E
SBR	140	139	99%	0	50	5	A
SB	**280**	**279**	**100%**			**35**	**C**
EBL	270	243	90%	50	200	75	E
EBT	590	514	**87%**	25	225	15	B
EBR	220	192	**87%**	25	225	6	A
EB	**1,080**	**949**	**88%**			**29**	**C**
WBL	20	22	110%	0	50	70	E
WBT	1,120	1,121	100%	50	300	20	B
WBR	80	77	96%	50	300	18	B
WB	**1,220**	**1,220**	**100%**			**21**	**B**
Total	**2,840**	**2,707**	**95%**			**26**	**C**

Node Letter: TB VISSIM ID: 3300

LOS Category: Signalized

4: Hamilton View — Delay / LOS

Mvmt	Demand	Volume Served	% Served	Queue (ft) Avg / 95th 900-4500		Analysis Period 900-4500	
NBL	270	262	97%	75	175	71	E
NBT	270	277	103%	50	150	46	D
NBR	180	177	98%	0	75	5	A
NB	**720**	**716**	**99%**			**45**	**D**
SBL	160	160	100%	50	125	87	F
SBT	410	403	98%	250	875	83	F
SBR	400	404	101%	250	875	70	E
SB	**970**	**967**	**100%**			**78**	**E**
EBL	150	136	91%	50	125	77	E
EBT	410	372	91%	25	125	17	B
EBR	230	204	**89%**	0	75	6	A
EB	**790**	**712**	**90%**			**25**	**C**
WBL	330	331	100%	75	200	66	E
WBT	550	552	100%	50	275	28	C
WBR	130	127	98%	50	275	23	C
WB	**1,010**	**1,010**	**100%**			**40**	**D**
Total	**3,490**	**3,405**	**98%**			**49**	**D**

Node Letter: TC VISSIM ID: 3400

2030PM_3NBL

LOS Category: Signalized

3: Market Center — Delay / LOS

Mvmt	Demand	Volume Served	% Served	Queue (ft) Avg / 95th 900-4500		Analysis Period 900-4500	
NBL	130	131	101%	50	175	51	D
NBT	40	40	100%	0	75	45	D
NBR	90	88	98%	0	50	5	A
NB	**260**	**259**	**100%**			**34**	**C**
SBL	110	111	101%	50	175	65	E
SBT	30	29	97%	0	75	57	E
SBR	140	139	99%	0	50	5	A
SB	**280**	**279**	**100%**			**35**	**C**
EBL	270	272	101%	50	200	69	E
EBT	590	574	97%	25	200	13	B
EBR	220	214	97%	25	225	6	A
EB	**1,080**	**1,060**	**98%**			**26**	**C**
WBL	20	22	110%	0	75	68	E
WBT	1,120	1,116	100%	50	300	20	B
WBR	80	76	95%	50	300	18	B
WB	**1,220**	**1,214**	**100%**			**21**	**C**
Total	**2,840**	**2,812**	**99%**			**26**	**C**

Node Letter: TB VISSIM ID: 3300

LOS Category: Signalized

4: Hamilton View — Delay / LOS

Mvmt	Demand	Volume Served	% Served	Queue (ft) Avg / 95th 900-4500		Analysis Period 900-4500	
NBL	270	262	97%	75	175	71	E
NBT	270	277	103%	50	150	46	D
NBR	180	177	98%	0	75	5	A
NB	**720**	**716**	**99%**			**45**	**D**
SBL	160	159	99%	50	150	91	F
SBT	410	400	98%	275	975	90	F
SBR	400	398	100%	275	975	76	E
SB	**970**	**957**	**99%**			**84**	**F**
EBL	150	148	99%	50	125	72	E
EBT	410	402	98%	25	125	19	B
EBR	230	223	97%	0	100	7	A
EB	**790**	**773**	**98%**			**26**	**C**
WBL	330	331	100%	75	200	66	E
WBT	550	552	100%	50	275	29	C
WBR	130	127	98%	75	275	23	C
WB	**1,010**	**1,010**	**100%**			**40**	**D**
Total	**3,490**	**3,456**	**99%**			**50**	**D**

Node Letter: TC VISSIM ID: 3400

Appendix H. Freeway Off-Ramp Analysis Vissim Link Results

VISSIM Link Results Comparison

Bangerter & 13400 South

2050AM_AuxLane+1LnOffRamp

Link Peak Results

Number of Runs: 10

134S NB								V: Speed (mph), K: Density (vpmpl), and LOS											
				Q: Hr Flow Rate / Lane			Length	Max 15-min. Interval				Segment Peak Hour				Peak Hour: 16:00			
ID	Location	Seg Type	Ln	Demand	Served	% Served	(ft)	V	K	LOS	Begin	V	K	LOS	Begin	V	K	LOS	
1	Mainline between 134 S and 27	D	3.7	980	960	98%	1,350	30	37	E	16:30	32	33	D	16:00	32	33	D	

134S SB								V: Speed (mph), K: Density (vpmpl), and LOS											
				Q: Hr Flow Rate / Lane			Length	Max 15-min. Interval				Segment Peak Hour				Peak Hour: 16:00			
ID	Location	Seg Type	Ln	Demand	Served	% Served	(ft)	V	K	LOS	Begin	V	K	LOS	Begin	V	K	LOS	
2	Mainline between 134 S and 12	W	4.0	930	940	100%	1,525	59	17	B	16:15	60	16	B	16:00	60	16	B	

2050PM_AuxLane+1LnOffRamp

Link Peak Results

Number of Runs: 10

134S NB								V: Speed (mph), K: Density (vpmpl), and LOS											
				Q: Hr Flow Rate / Lane			Length	Max 15-min. Interval				Segment Peak Hour				Peak Hour: 16:00			
ID	Location	Seg Type	Ln	Demand	Served	% Served	(ft)	V	K	LOS	Begin	V	K	LOS	Begin	V	K	LOS	
1	Mainline between 134 S and 27	D	3.7	1,270	1,230	97%	1,350	36	32	D	16:30	37	30	D	16:00	37	30	D	

134S SB								V: Speed (mph), K: Density (vpmpl), and LOS											
				Q: Hr Flow Rate / Lane			Length	Max 15-min. Interval				Segment Peak Hour				Peak Hour: 16:00			
ID	Location	Seg Type	Ln	Demand	Served	% Served	(ft)	V	K	LOS	Begin	V	K	LOS	Begin	V	K	LOS	
2	Mainline between 134 S and 12	W	4.0	1,080	1,080	100%	1,525	56	21	C	16:15	57	19	B	16:00	57	19	B	

2050AM_AuxLane+2LnOffRamps

Link Peak Results

Number of Runs: 10

134S NB								V: Speed (mph), K: Density (vpmpl), and LOS											
				Q: Hr Flow Rate / Lane			Length	Max 15-min. Interval				Segment Peak Hour				Peak Hour: 16:00			
ID	Location	Seg Type	Ln	Demand	Served	% Served	(ft)	V	K	LOS	Begin	V	K	LOS	Begin	V	K	LOS	
1	Mainline between 134 S and 27	D	3.7	980	960	98%	1,350	47	20	C	16:15	47	19	B	16:00	47	19	B	

134S SB								V: Speed (mph), K: Density (vpmpl), and LOS											
				Q: Hr Flow Rate / Lane			Length	Max 15-min. Interval				Segment Peak Hour				Peak Hour: 16:00			
ID	Location	Seg Type	Ln	Demand	Served	% Served	(ft)	V	K	LOS	Begin	V	K	LOS	Begin	V	K	LOS	
2	Mainline between 134 S and 12	W	4.0	930	940	100%	1,525	60	16	B	16:15	60	15	B	16:00	60	15	B	

2050PM_AuxLane+2LnOffRamps

Link Peak Results

Number of Runs: 10

134S NB								V: Speed (mph), K: Density (vpmpl), and LOS											
				Q: Hr Flow Rate / Lane			Length	Max 15-min. Interval				Segment Peak Hour				Peak Hour: 16:00			
ID	Location	Seg Type	Ln	Demand	Served	% Served	(ft)	V	K	LOS	Begin	V	K	LOS	Begin	V	K	LOS	
1	Mainline between 134 S and 27	D	3.7	1,270	1,230	97%	1,350	46	23	C	16:30	47	23	C	16:00	47	23	C	

134S SB								V: Speed (mph), K: Density (vpmpl), and LOS											
				Q: Hr Flow Rate / Lane			Length	Max 15-min. Interval				Segment Peak Hour				Peak Hour: 16:00			
ID	Location	Seg Type	Ln	Demand	Served	% Served	(ft)	V	K	LOS	Begin	V	K	LOS	Begin	V	K	LOS	
2	Mainline between 134 S and 12	W	4.0	1,080	1,080	101%	1,525	59	19	B	16:15	60	18	B	16:00	60	18	B	

2050AM_TaperExit+1LnOffRamp

Link Peak Results

Number of Runs: 10

134S NB								V: Speed (mph), K: Density (vpmpl), and LOS											
				Q: Hr Flow Rate / Lane			Length	Max 15-min. Interval				Segment Peak Hour				Peak Hour: 16:00			
ID	Location	Seg Type	Ln	Demand	Served	% Served	(ft)	V	K	LOS	Begin	V	K	LOS	Begin	V	K	LOS	
1	Mainline between 134 S and 27	D	3.0	1,200	1,170	98%	1,350	21	70	F	16:30	26	53	F	16:00	26	53	F	

134S SB								V: Speed (mph), K: Density (vpmpl), and LOS											
				Q: Hr Flow Rate / Lane			Length	Max 15-min. Interval				Segment Peak Hour				Peak Hour: 16:00			
ID	Location	Seg Type	Ln	Demand	Served	% Served	(ft)	V	K	LOS	Begin	V	K	LOS	Begin	V	K	LOS	
2	Mainline between 134 S and 12	D	3.5	1,070	1,060	99%	1,525	56	23	C	16:15	57	21	C	16:00	57	21	C	

2050PM_TaperExit+1LnOffRamp

Link Peak Results

Number of Runs: 10

134S NB								V: Speed (mph), K: Density (vpmpl), and LOS											
				Q: Hr Flow Rate / Lane			Length	Max 15-min. Interval				Segment Peak Hour				Peak Hour: 16:00			
ID	Location	Seg Type	Ln	Demand	Served	% Served	(ft)	V	K	LOS	Begin	V	K	LOS	Begin	V	K	LOS	
1	Mainline between 134 S and 27	D	3.0	1,550	1,500	97%	1,350	23	67	F	16:45	27	59	F	16:00	27	59	F	

134S SB								V: Speed (mph), K: Density (vpmpl), and LOS											
				Q: Hr Flow Rate / Lane			Length	Max 15-min. Interval				Segment Peak Hour				Peak Hour: 16:00			
ID	Location	Seg Type	Ln	Demand	Served	% Served	(ft)	V	K	LOS	Begin	V	K	LOS	Begin	V	K	LOS	
2	Mainline between 134 S and 12	D	3.5	1,230	1,220	99%	1,525	51	29	D	16:15	52	26	C	16:00	52	26	C	

VISSIM Link Results Comparison

Bangerter & 13400 South

2030AM_AuxLane+2LnOffRamp

Link Peak Results

Number of Runs: 10

134S NB								V: Speed (mph), K: Density (vpmpl), and LOS											
				Q: Hr Flow Rate / Lane			Length	Max 15-min. Interval				Segment Peak Hour				Peak Hour: 16:00			
ID	Location	Seg Type	Ln	Demand	Served	% Served	(ft)	V	K	LOS	Begin	V	K	LOS	Begin	V	K	LOS	
1	Mainline between 134 S and 27	D	3.7	780	770	98%	1,350	42	16	B	16:45	44	15	B	16:00	44	15	B	

134S SB								V: Speed (mph), K: Density (vpmpl), and LOS											
				Q: Hr Flow Rate / Lane			Length	Max 15-min. Interval				Segment Peak Hour				Peak Hour: 16:00			
ID	Location	Seg Type	Ln	Demand	Served	% Served	(ft)	V	K	LOS	Begin	V	K	LOS	Begin	V	K	LOS	
2	Mainline between 134 S and 12	W	4.0	700	710	100%	1,525	61	12	B	16:15	61	11	B	16:00	61	11	B	

2030PM_AuxLane+2LnOffRamp

Link Peak Results

Number of Runs: 10

134S NB								V: Speed (mph), K: Density (vpmpl), and LOS											
				Q: Hr Flow Rate / Lane			Length	Max 15-min. Interval				Segment Peak Hour				Peak Hour: 16:00			
ID	Location	Seg Type	Ln	Demand	Served	% Served	(ft)	V	K	LOS	Begin	V	K	LOS	Begin	V	K	LOS	
1	Mainline between 134 S and 27	D	3.7	1,140	1,090	96%	1,350	45	20	C	16:45	46	19	B	16:00	46	19	B	

134S SB								V: Speed (mph), K: Density (vpmpl), and LOS											
				Q: Hr Flow Rate / Lane			Length	Max 15-min. Interval				Segment Peak Hour				Peak Hour: 16:00			
ID	Location	Seg Type	Ln	Demand	Served	% Served	(ft)	V	K	LOS	Begin	V	K	LOS	Begin	V	K	LOS	
2	Mainline between 134 S and 12	W	4.0	970	980	101%	1,525	60	17	B	16:15	60	16	B	16:00	60	16	B	

2030AM_AuxLane+1LnOffRamp

Link Peak Results

Number of Runs: 10

134S NB								V: Speed (mph), K: Density (vpmpl), and LOS											
				Q: Hr Flow Rate / Lane			Length	Max 15-min. Interval				Segment Peak Hour				Peak Hour: 16:00			
ID	Location	Seg Type	Ln	Demand	Served	% Served	(ft)	V	K	LOS	Begin	V	K	LOS	Begin	V	K	LOS	
1	Mainline between 134 S and 27	D	3.7	780	770	98%	1,350	39	18	B	16:15	39	17	B	16:00	39	17	B	

134S SB								V: Speed (mph), K: Density (vpmpl), and LOS											
				Q: Hr Flow Rate / Lane			Length	Max 15-min. Interval				Segment Peak Hour				Peak Hour: 16:00			
ID	Location	Seg Type	Ln	Demand	Served	% Served	(ft)	V	K	LOS	Begin	V	K	LOS	Begin	V	K	LOS	
2	Mainline between 134 S and 12	W	4.0	700	710	100%	1,525	61	12	B	16:15	61	11	B	16:00	61	11	B	

2030PM_AuxLane+1LnOffRamp

Link Peak Results

Number of Runs: 10

134S NB								V: Speed (mph), K: Density (vpmpl), and LOS											
				Q: Hr Flow Rate / Lane			Length	Max 15-min. Interval				Segment Peak Hour				Peak Hour: 16:00			
ID	Location	Seg Type	Ln	Demand	Served	% Served	(ft)	V	K	LOS	Begin	V	K	LOS	Begin	V	K	LOS	
1	Mainline between 134 S and 27	D	3.7	1,140	1,090	96%	1,350	39	24	C	16:45	40	23	C	16:00	40	23	C	

134S SB								V: Speed (mph), K: Density (vpmpl), and LOS											
				Q: Hr Flow Rate / Lane			Length	Max 15-min. Interval				Segment Peak Hour				Peak Hour: 16:00			
ID	Location	Seg Type	Ln	Demand	Served	% Served	(ft)	V	K	LOS	Begin	V	K	LOS	Begin	V	K	LOS	
2	Mainline between 134 S and 12	W	4.0	970	980	101%	1,525	59	17	B	16:15	60	16	B	16:00	60	16	B	

2030AM_TaperExit+1LnOffRamp

Link Peak Results

Number of Runs: 10

134S NB								V: Speed (mph), K: Density (vpmpl), and LOS											
				Q: Hr Flow Rate / Lane			Length	Max 15-min. Interval				Segment Peak Hour				Peak Hour: 16:00			
ID	Location	Seg Type	Ln	Demand	Served	% Served	(ft)	V	K	LOS	Begin	V	K	LOS	Begin	V	K	LOS	
1	Mainline between 134 S and 27	D	3.0	960	940	98%	1,350	38	24	C	16:45	40	23	C	16:00	40	23	C	

134S SB								V: Speed (mph), K: Density (vpmpl), and LOS											
				Q: Hr Flow Rate / Lane			Length	Max 15-min. Interval				Segment Peak Hour				Peak Hour: 16:00			
ID	Location	Seg Type	Ln	Demand	Served	% Served	(ft)	V	K	LOS	Begin	V	K	LOS	Begin	V	K	LOS	
2	Mainline between 134 S and 12	D	3.5	800	800	99%	1,525	60	16	B	16:15	60	14	B	16:00	60	14	B	

2030PM_TaperExit+1LnOffRamp

Link Peak Results

Number of Runs: 10

134S NB								V: Speed (mph), K: Density (vpmpl), and LOS											
				Q: Hr Flow Rate / Lane			Length	Max 15-min. Interval				Segment Peak Hour				Peak Hour: 16:00			
ID	Location	Seg Type	Ln	Demand	Served	% Served	(ft)	V	K	LOS	Begin	V	K	LOS	Begin	V	K	LOS	
1	Mainline between 134 S and 27	D	3.0	1,390	1,330	96%	1,350	36	36	E	16:45	38	34	D	16:00	38	34	D	

134S SB								V: Speed (mph), K: Density (vpmpl), and LOS											
				Q: Hr Flow Rate / Lane			Length	Max 15-min. Interval				Segment Peak Hour				Peak Hour: 16:00			
ID	Location	Seg Type	Ln	Demand	Served	% Served	(ft)	V	K	LOS	Begin	V	K	LOS	Begin	V	K	LOS	
2	Mainline between 134 S and 12	D	3.5	1,110	1,100	100%	1,525	56	24	C	16:15	57	22	C	16:00	57	22	C	



Appendix B: Traffic and Design

Bangerter Highway at 13400 South
Alternatives Memo

BANGERTER
13400 SOUTH

ALTERNATIVES MEMO

BANGERTER HIGHWAY AT 13400 SOUTH

FEBRUARY 21, 2022

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Alternatives

INTRODUCTION

The Utah Department of Transportation (UDOT) is conducting a State Environmental Study (SES) to analyze improvements at the Bangerter Highway (State Route 154) and 13400 South intersection in Riverton, Utah. The Wasatch Front Regional Council's 2019–2050 Regional Transportation Plan (RTP) includes projects to convert Bangerter Highway into a freeway system by replacing the at-grade intersections with grade-separated interchanges.

Currently, vehicles at the Bangerter Highway and 13400 South intersection wait an average of 61 seconds (equivalent to a level of service [LOS] of E) to get through the intersection during the AM and PM peak periods. For this analysis, the AM peak period is from 7:00 to 9:00 AM, and the PM peak period is from 4:00 to 6:00 PM.

Level of service is a measure of the operating conditions on a road or at an intersection. Level of service is represented by a letter "grade" ranging from A (free-flowing traffic and little delay) to F (extremely congested, stop-and-go traffic and excessive delay). For roads such as Bangerter Highway, UDOT considers LOS A through D to be acceptable operating conditions and LOS E and F to be unacceptable operating conditions.

If operational improvements are not made at this intersection, traffic modeling indicates that, by 2050, the intersection would operate at LOS F, and delays would exceed 180 seconds per vehicle during both the AM and PM peak periods. Additionally, traffic modeling indicates that, by 2050, long queues of vehicles stopped at the Bangerter Highway and 13400 South intersection would extend back through adjacent intersections on 13400 South (4050 West, Market Center Drive, and Hamilton View Road), causing those intersections to fail (that is, operate at LOS F) during at least one peak period.

The needs for the current project (converting the Bangerter Highway and 13400 South intersection to a grade-separated interchange) are:

- Current failing conditions (LOS E and F) at the Bangerter Highway and 13400 South intersection
- Future failing conditions (LOS F) at the Bangerter Highway and 13400 South intersection that will also cause neighboring interchanges and intersections to fail
- Future congestion throughout the local street network due to long queues of vehicles stopped at the Bangerter Highway and 13400 South intersection

The purpose of the project is to:

- Reduce current and future delay at the Bangerter Highway and 13400 South intersection (metric: level of service at the intersection)
- Improve traffic operations and mobility on Bangerter Highway at the 13400 South intersection (metric: vehicle queue lengths on mainline Bangerter Highway)
- Reduce future congestion throughout the local street network (metric: level of service at 13400 South local intersections)

ALTERNATIVES DEVELOPMENT AND SCREENING

As part of this project, UDOT developed and screened a range of alternatives. Two screenings were conducted: a purpose and need screening and a key environmental impacts screening. The purpose of this memo is to describe that process and how UDOT arrived at the alternative selected to be evaluated in the SES.

UDOT developed and evaluated a range of alternatives for the Bangerter Highway and 13400 South intersection. In this location, certain corridor constraints limited what alternatives were feasible.

CORRIDOR CONSTRAINTS

SOUTH BANGERTER HEALTH CENTER

The South Bangerter Health Center is located north of 13400 South and east of Bangerter Highway. Avoiding impacts to this new health center was a priority for UDOT.

COMMERCIAL DEVELOPMENT

Dense commercial development is located north and south of 13400 South, and east and west of Bangerter Highway south of 13400 South. Limiting property impacts to commercial development was a priority for UDOT.

INTERCHANGE ALTERNATIVES VERSUS NO BUILD

INTERCHANGE ALTERNATIVES

UDOT developed two alternatives for the interchange at Bangerter Highway and 13400 South: a single-point urban interchange (SPUI) and a tight diamond interchange. Both interchange alternatives have the same cross section on 13400 South tying into the interchange. All left turns have two lanes, and all right turns have one lane except the eastbound right turn from Bangerter Highway to 13400 South, which has two lanes.

A third interchange alternative, a diverging diamond, was also considered; however, the spacing between intersections on 13400 South does not allow for a diverging diamond interchange.

NO BUILD

With the no build alternative, all of the projects proposed in the 2019–2050 RTP would be built except for an interchange at Bangerter Highway and 13400 South. The no build alternative assumes that Bangerter Highway and 13400 South would continue to be an at-grade intersection. The RTP projects included as part of the no build alternative are:

- Mountain View Corridor as a freeway (RTP projects R-S-102 and R-S-103)
- Reversible lanes on 12600 South between Bangerter Highway and the Mountain View Corridor (RTP project R-S-68)
- 13400 South as a local expressway between the Mountain View Corridor and Bangerter Highway (RTP project R-S-74)
- Bangerter Highway as a freeway except at the 13400 South intersection
- Constructing 4000 West/4050 West as a four-lane road between 12600 South and 13400 South, which would convert the existing 4050 West intersection on 13400 South from a three-way intersection to a four-way intersection (RTP project R-S-109)
- Widening 4000 West/4050 West to four lanes from 11800 South to 12600 South (RTP project R-S-110)
- Widening Redwood Road to seven lanes from Bangerter Highway to Porter Rockwell Boulevard (RTP project R-S-122)

PURPOSE AND NEED SCREENING

The purpose and need screening evaluated the ability of the interchange and no build alternatives to meet the purpose of and need for the project, as described in the Introduction. This evaluation included three measures of effectiveness, which are listed in Table 1.

Although both interchange alternatives would improve both traffic performance and vehicle queue lengths compared to the no build alternative, the SPUI would perform better than the tight diamond interchange, particularly during the 2050 PM peak period. During the PM peak period, the SPUI would operate at LOS C, while the tight diamond interchange would operate at LOS E. Based on its better traffic performance, UDOT selected the SPUI as the interchange alternative to be evaluated in the SES.

Table 1. Purpose and Need Screening: Interchange and No Build Alternatives

Need	Measure of Effectiveness	Interchange Alternatives		No Build Alternative
		SPUI[a]	Tight Diamond[a]	At-grade Intersection
Current failing conditions (LOS E and F) at the Bangerter Highway and 13400 South intersection	Provides LOS D or better at the Bangerter Highway and 13400 South intersection	Yes (LOS C)	No (LOS E)	No (LOS F)
Future failing conditions (LOS F) at the Bangerter Highway and 13400 South intersection				
Future congestion throughout the local street network due to a traffic bottleneck at Bangerter Highway and 13400 South	Reduces future congestion throughout the local street network	Yes	Yes	No
Results		**Advanced**	**Eliminated**	**Eliminated**

Sources: *Bangerter Highway & 13400 South Existing and 2050 No Build Traffic Analysis* (Avenue Consultants, 2021); *Bangerter Highway & 13400 South Future Build Traffic Analysis* (Avenue Consultants, 2021)

[a] For this initial screening analysis, UDOT assumed that both the SPUI and tight diamond alternatives would have dual-lane left turns and single-lane right turns for all movements except for the eastbound right-turn movement, which was assumed to have two lanes. The final SPUI interchange proposed in the SES was revised to include single-lane ramps for the southbound and westbound left-turn movements, and it would operate at LOS D. The change to single-lane ramps for these movements was made to reduce cost and minimize impacts to adjacent properties.

HORIZONTAL ALIGNMENT ALTERNATIVES

Three horizontal alignment alternatives were considered for Bangerter Highway: east shift, hybrid shift (split the Bangerter Highway alignment to both the west and east sides), and west shift.

KEY ENVIRONMENTAL IMPACTS SCREENING

The key environmental impacts screening evaluated the horizontal alignment alternatives based on their expected impacts to certain environmental resources including the number of business relocations and impacts to the Home Depot parking lot (Table 2).

Table 2. Key Environmental Impacts Screening: Horizontal Alignment Alternatives

Resource	Horizontal Alignment Alternatives		
	East Shift (Figure 1)	Hybrid Shift (Figure 2)	West Shift (Figure 3)
Business relocations	3 (3 buildings)	1 (1 building)	0 (0 buildings)
Impacts to Home Depot parking lot	Yes	Yes	No
Results	**Eliminated**	**Eliminated**	**Advanced**

The east shift alternative (Figure 1) and hybrid shift alternative (Figure 2) were both eliminated because they would require relocating the South Bangerter Health Center and would have impacts to the Home Depot parking lot and the business's operations. The east shift alternative would also require relocating the IHOP and Wingers on 13400 South. Ultimately, UDOT decided to evaluate the west shift alternative (Figure 3) in the SES because it would avoid any commercial property relocations and impacts to the Home Depot parking lot and the business's operations.

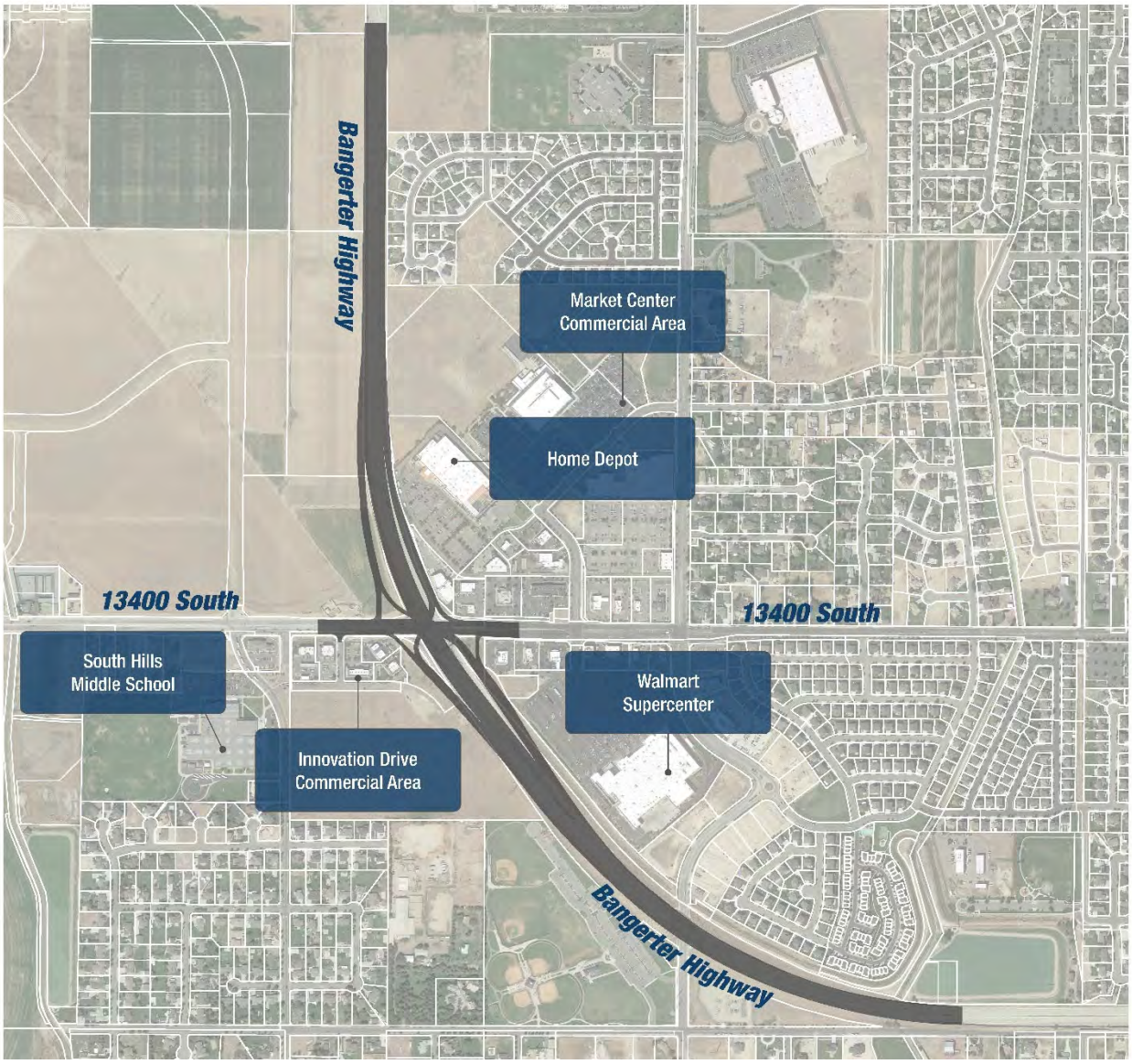
Figure 1: East Shift Horizontal Alignment Alternative



Figure 2: Hybrid Shift Horizontal Alignment Alternative



Figure 3: West Shift Horizontal Alignment Alternative



WEST SHIFT HORIZONTAL ALIGNMENT ALTERNATIVE: VERTICAL ALIGNMENT OPTIONS

UDOT evaluated three vertical alignment options with the west shift alternative:

1. **Over:** Bangerter Highway over 13400 South with 13400 South at the existing grade
2. **Under:** Bangerter Highway under 13400 South with 13400 South at the existing grade
3. **Hybrid:** a hybrid option with Bangerter Highway over 13400 South with 13400 South below the existing grade

UDOT coordinated these vertical alignment options with Riverton City early in the decision-making process.

KEY ENVIRONMENTAL IMPACTS SCREENING

As shown in Table 3, the key environmental impacts from the over, under, and hybrid vertical alignment options would be similar. The biggest differences among the three options would be the estimated cost to construct Bangerter Highway under 13400 South instead of over 13400 South and utility considerations. Because all three options would have similar impacts and because the availability of both state and local funding is uncertain, UDOT decided to evaluate all three vertical alignment options in the SES. This decision will continue to be coordinated with Riverton City.

Table 3. Key Environmental Impacts Screening: Vertical Alignment Options

Resource	Vertical Alignment Option		
	Over Bangerter Highway over 13400 South (Figure 4)	**Under** Bangerter Highway under 13400 South (Figure 5)	**Hybrid** Bangerter Highway over 13400 South with 13400 South below existing grade (Figure 6)
Business relocations	0	0	0
Residential relocations	0	0	0
Potential relocations	0	0	0
Partial property acquisitions	14	14	14
Potential property acquisitions	1	1	1
Total number of parcels impacted	15 parcels	15 parcels	15 parcels
Temporary easements and perpetual easements	3	4	6
Rose Creek impact (linear feet)	1,305 feet	1,305 feet	1,508 feet

(*continued on next page*)

Resource	Vertical Alignment Option		
	Over Bangerter Highway over 13400 South (Figure 4)	**Under** Bangerter Highway under 13400 South (Figure 5)	**Hybrid** Bangerter Highway over 13400 South with 13400 South below existing grade (Figure 6)
Noise impacts	Noise levels would range from 53 to 73 dBA compared to the existing conditions of 49 to 71 dBA. 78 of the 168 receptors would have traffic noise impacts (they would exceed noise-abatement criteria).	Noise levels would range from 53 to 73 dBA compared to the existing conditions of 49 to 71 dBA. 65 of the 168 receptors would have traffic noise impacts (they would exceed noise-abatement criteria).	Noise levels would range from 53 to 74 dBA compared to the existing conditions of 49 to 71 dBA. 54 of the 168 receptors would have traffic noise impacts (they would exceed noise-abatement criteria).
Utility impacts	Would require utility relocations for AT&T, First Digital, Summit Infrastructure Group, Syringa, and Zayo Group fiber lines; and Rocky Mountain Power underground and overhead power lines in a new alignment where it crosses Bangerter Highway.	Would require utility relocations for Riverton City sewer, water, and irrigation lines; South Valley Sewer District sewer lines; a Jordan Valley Water Conservation District water line; AT&T, CenturyLink, Comcast Cable, First Digital, Summit Infrastructure Group, Syringa, and Zayo Group fiber lines; Dominion Energy gas lines; and Rocky Mountain Power underground and overhead power lines in a new alignment where it crosses Bangerter Highway.	Would require utility relocations for Riverton City sewer, water, and irrigation lines; South Valley Sewer District sewer lines; AT&T, CenturyLink, Comcast Cable, First Digital, Summit Infrastructure Group, Syringa, and Zayo Group fiber lines; Dominion Energy and Kern River Gas Transmission Company gas lines; and Rocky Mountain Power underground and overhead power lines in a new alignment where it crosses Bangerter Highway.
Maintenance of traffic considerations	Moderate; there could potentially be delays and temporary closures of 13400 South during construction.	Complex; there would be delays and temporary closures of 13400 South during construction. The temporary closures of 13400 South would be required for the under option.	Complex; there would be delays and temporary closures of 13400 South during construction. The temporary closures of 13400 South would be required for the hybrid option.
Estimated cost[a]	$106,000,000	$126,000,000	$110,000,000
Results	**Advanced**	**Advanced**	**Advanced**

[a] Costs were updated February 2022

Figure 4: West Shift Horizontal Alignment, Bangerter Highway Over Option

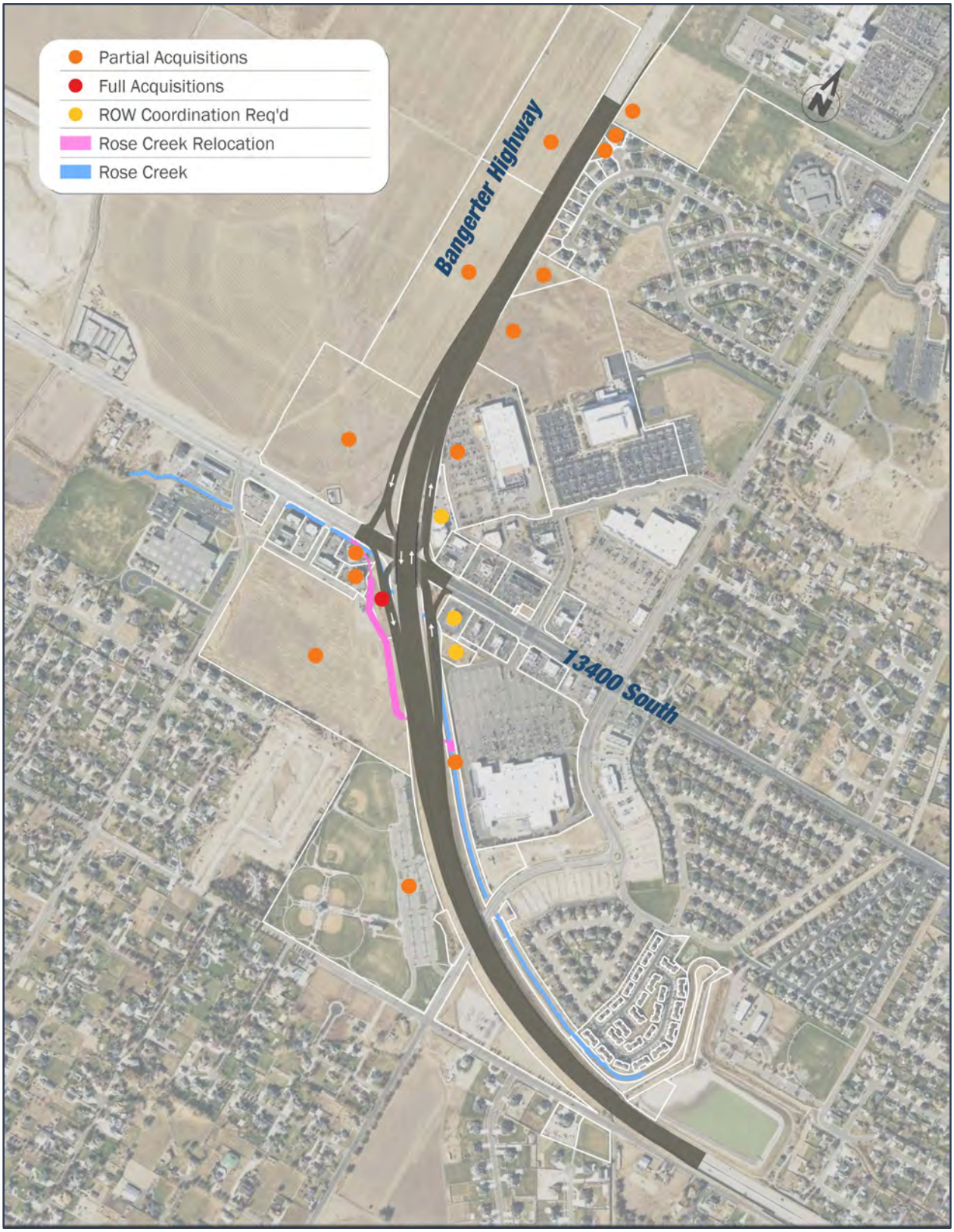


Figure 5: West Shift Horizontal Alignment, Bangerter Highway Under Option

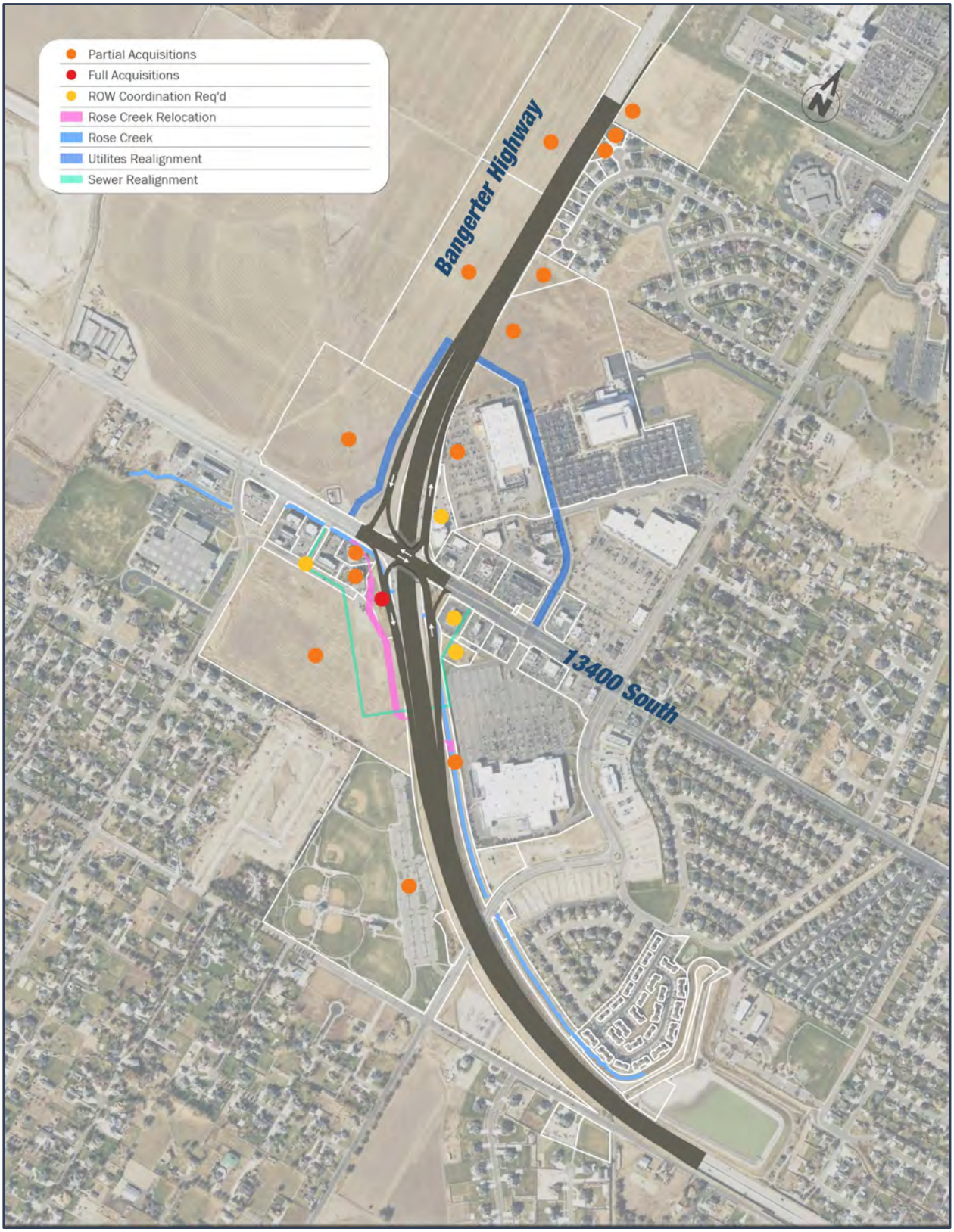
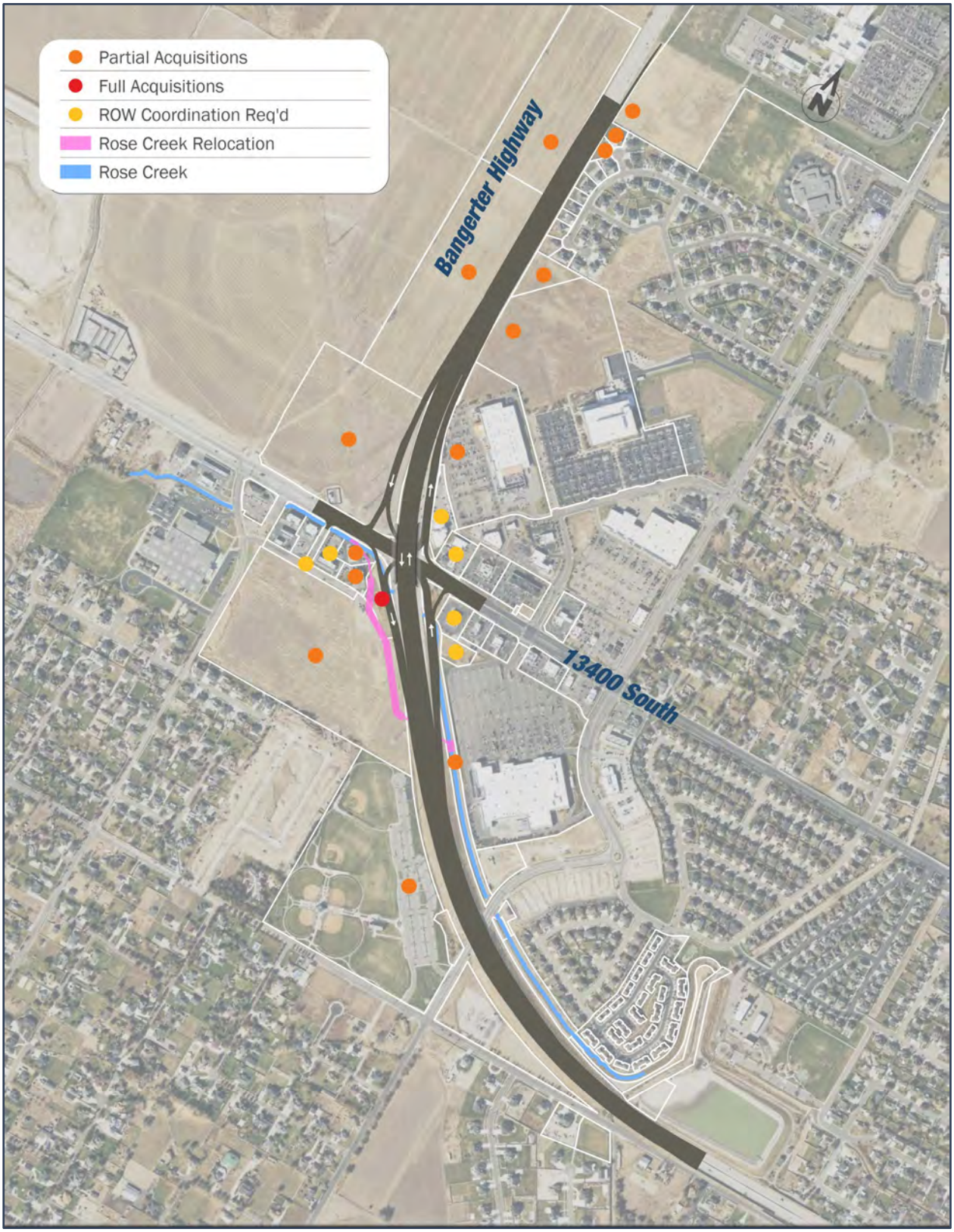


Figure 6: West Shift Horizontal Alignment, Bangerter Highway Hybrid Option



SUMMARY

The action alternative selected to be evaluated in the SES is the SPUI west shift alternative with three vertical alignment options. The no build alternative will also be evaluated to provide a baseline for the action alternative.



Appendix C: Public Involvement

Bangerter Highway at 13400 South
Public Scoping Report

BANGERTER

BANGERTER HIGHWAY AT 13400 SOUTH

PUBLIC SCOPING REPORT

PIN: 18808

Project Number: S-0154(92)0

Prepared For: Utah Department of Transportation

Prepared By: Horrocks Engineers & HDR

Date: November 16, 2021

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PROJECT OVERVIEW

The Utah Department of Transportation (UDOT) has initiated State Environmental Studies (SESs) for the following intersections along Bangerter Highway:

- 2700 West
- 13400 South
- 9800 South
- 4700 South
- 4100 South
- 3500 South to S.R. 201
- California Avenue

Bangerter Highway is a major north-south corridor in the state of Utah, and with continued growth in the area, the amount of traffic on Bangerter Highway is expected to increase. This projected increase in traffic will also increase delays on Bangerter Highway by up to four times longer than the current conditions. UDOT is proposing to replace at-grade, signalized intersections along the corridor with grade-separated interchanges, which will allow one street to pass over the other. This separation will move Bangerter Highway and cross-street traffic more efficiently and will eliminate points of conflict along this busy highway.

The purpose of this study is to identify the best solution to address the needs along Bangerter Highway, evaluate the impacts of the proposed improvements to the natural and built environments, and provide opportunities for public input.

PUBLIC SCOPING MEETING

Meeting Overview

An online public scoping meeting and an in-person public scoping meeting (open house format) were held to educate and inform the public about the SES process and gather input regarding the study.

TIME/LOCATION

Online Presentation and Q&A	**Date & Time** Tuesday, July 13, 2021, 6 – 7 p.m. **Location** Zoom Webinar Online meeting registration at udot.utah.gov/Bangerter13400South
In-Person Open House	**Date & Time** Wednesday, July 14, 2021, 6 – 7:30 p.m. **Location** South Hills Middle School 13508 S 9800 4000 W Riverton, UT 84065

Advertisements

Advertisements for the Online Presentation and Q&A and the In-person Public Meeting were through the following methods:

- Postcard mailer
- Legal ads
- Social Media
- Business canvassing
- Email notification
- Website
- Media notice

Copies of the meeting advertisements are available in Appendix A.

POSTCARD MAILER

A postcard mailer with information about the online presentation and the in-person open house was sent to **1,209** addresses near the project study area on June 24, 2021 (see Appendix A-1 and A-2).

LEGAL AD

Legal ads were placed in the print and online editions of *The Salt Lake Tribune* and *Deseret News* (see Appendix A-3).

The ads ran on the following dates:

The Salt Lake Tribune	**Print** Sunday, June 27, 2021 Sunday, July 4, 2021 **Digital** Tuesday, June 29, 2021 Tuesday, July 6, 2021
Deseret News	**Print** Friday, June 25, 2021 Friday, July 2, 2021 **Digital** Tuesday, June 29, 2021 Tuesday, July 6, 2021

SOCIAL MEDIA

Social media images and messages were developed for UDOT and cities near the study area to post on their accounts (see Appendix A-4).

Facebook				
Date	**User**	**Reactions**	**Comments**	**Shares**
7/7/2021	Herriman City	61	45	21
7/13/2021	Riverton, Utah	19	19	3
7/13/2021	Herriman City	9	20	6
7/14/2021	Riverton, Utah	7	0	0
Twitter				
Date	**User**	**Replies**	**Retweets**	**Likes**
7/7/2021	Herriman City	0	4	4
7/14/2021	UDOT Region Two	0	5	7

EMAIL NOTIFICATION

An email notification for the 13400 South SES Online Presentation and In-person Open House was sent to the Bangerter Environmental distribution list via MailChimp on July 7, 2021 (see Appendix A-5).

An email notification for Bangerter 13400 South, Bangerter 4700 South and Bangerter 9800 South SES Online Presentations and In-person Public Meetings were sent to the Bangerter Construction distribution list via MailChimp on July 12, 2021. Due to broken links in the email, an updated email was sent to the Bangerter Construction distribution list on July 13, 2021 (see Appendix A-6).

Email Notification Performance:

Bangerter Environmental List Email – July 7, 2021

Subject: Bangerter 13400 Public Meeting Notice

Recipients: 99	Opens[1]: 33	Clicks: 2	Bounces: 5
Successful Deliveries: 94	Total Opens: 64	Total Clicks: 3	Unsubscribes: 0

Bangerter Construction List Email – July 12, 2021

Subject: Upcoming environmental Public Meeting Opportunities

Recipients: 1,703	Opens: 602	Clicks: 56	Bounces: 9
Successful Deliveries: 1,694	Total Opens: 1,482	Total Clicks: 286	Unsubscribes: 1

Bangerter Construction List Email (Updated) – July 13, 2021

Subject: UPDATED INFORMATION: Upcoming environmental Public Meeting Opportunities

Recipients: 1,702	Opens: 679	Clicks: 59	Bounces: 8
Successful Deliveries: 1,694	Total Opens: 1,362	Total Clicks: 189	Unsubscribes: 0

[1] "Opens" is the number of recipients that opened the email any number of times and does not include multiple opens by a recipient. "Total Opens" is the total number of times the email was opened by all recipients.

BUSINESS NOTIFICATION

Flyers with meeting information were drafted and distributed to commercial areas near the study area on Wednesday, July 7, 2021. Commercial areas covered included (see Appendix A-7):

- Market Center Drive commercial area east of Bangerter on the north and south sides of 13400 South
- Innovation Drive commercial area west of Bangerter on the south side of 13400 South

WEBSITE CONTENT

Information about the public meeting was drafted and posted to the Bangerter 13400 South website. The content included details about the time, location and meeting registration for the Online Presentation and Q&A meeting (see Appendix A-8).

MEDIA NOTIFICATION

A press release was drafted for the UDOT Region Two Public Information Officer to distribute to various media outlets. The press release contained general information about the Bangerter Environmental Studies. The release was sent out on July 12,2021 (see Appendices A-9 and A-10).

Subsequent media coverage about the public meetings included 12 news slots on local TV, radio and blog newscasts. Post-meeting coverage included three news slots on local TV newscasts.

Attendance

ONLINE PRESENTATION AND Q&A

The online presentation and Q&A received 75 attendance registrations and **47 unique total viewers** (see Appendix B-1 for a list of meeting attendees).

IN-PERSON OPEN HOUSE

The In-person Open House recorded **37 attendees** who signed in (see Appendix B-2 for a list of meeting attendees).

Information Presented

ONLINE PRESENTATION AND Q&A

The Online Presentation and Q&A was presented via Zoom webinar. Primary presenters included UDOT Project Manager Brian Allen and UDOT Environmental Manager Tyler Allen. During the Zoom session, presenters spoke while displaying slides with information about the Bangerter 13400 South intersection, the SES for the intersection, contact information and more. Following the presentation, panelists were available to answer attendee questions. Panelists included: Brian Allen, Tyler Allen, Marwan Farah, Amy Croft and John Blumenkamp. The meeting was moderated by Brian Gray and Melissa Phillips.

The presentation was recorded and is available for public viewing under the “Public Meeting” tab of the Bangerter 13400 South project webpage (udot.utah.gov/bangerter13400south). See Appendix C-1 and C-2 for materials presented at this meeting.

IN-PERSON PUBLIC MEETING

The In-person Public Meeting was held at South Hills Middle School in Riverton on Wednesday, July 14, from 6 p.m. to 8 p.m. The meeting was an open house with information boards displayed. Experts and specialists were on hand to answer attendee questions about the SES and the impacts of a potential grade-separated interchange. See Appendix C-3 for materials presented at this meeting.

PUBLIC COMMENTS

The project team collected public comments about the Bangerter 13400 South SES during the 30-day public comment period, from June 28, 2021, to July 28, 2021. Stakeholders were able to leave public comments via written, hotline, email or postage. See Appendix D for a list of the collected public comments.

A total of **28 comments** were collected:

- 18 written
- 9 email
- 1 postage

Primary topics included:

- Noise abatement
- Trash cleanup
- Pedestrian safety/bridge
- Traffic congestion
- General design concerns (preference for 10400 South–style interchange)
- Potential business relocation
- Right-of-way
- Bangerter 2700 West intersection
- Utility concerns
- Canal
- Multi-modal transportation
- Herriman growth

Appendix A: Advertisements

A-1 Postcard Mailer

BANGERTER
13400 SOUTH

YOU'RE INVITED! ENVIRONMENTAL STUDY PUBLIC MEETING OPPORTUNITIES

The Utah Department of Transportation (UDOT) has recently started a State Environmental Study (SES) to evaluate a potential freeway-style interchange at Bangerter Highway and 13400 South in order to reduce congestion and improve safety. The study is scheduled for completion in early 2022, with construction slated for 2023*.

The study team is hosting two initial public meetings to gather feedback about overall transportation needs and environmental issues that should be considered during the study. Input received will help the team develop and refine the preferred design concept that will be available for comment later in the SES process. **For more information and to stay informed about study progress and future public engagement opportunities, visit the study website and sign up for email updates.**

ONLINE PRESENTATION AND Q&A

When: Tuesday , July 13, 2021
6 - 7 p.m.

Where: Zoom Webinar
Visit the study website for information on how to join the online meeting.
udot.utah.gov/bangerter13400south

IN-PERSON OPEN HOUSE

When: Wednesday, July 14, 2021
6 - 7:30 p.m.

Where: South Hills Middle School
13508 S 4000 W
Riverton, UT 84065
(See map on reverse side)

The same information and materials will be available at both meetings. If you cannot participate in either opportunity, materials can be reviewed on the project website and feedback can be sent via email or postage.

**Environmental studies are process-driven, meaning this schedule is approximate and subject to change.*

Hotline: 888-766-ROAD (7623) | **Email:** bangerter@utah.gov | **Website:** udot.utah.gov/bangerter13400South

A UDOT PROJECT

In-person Open House Location

Parking is available at South Hills Middle School.

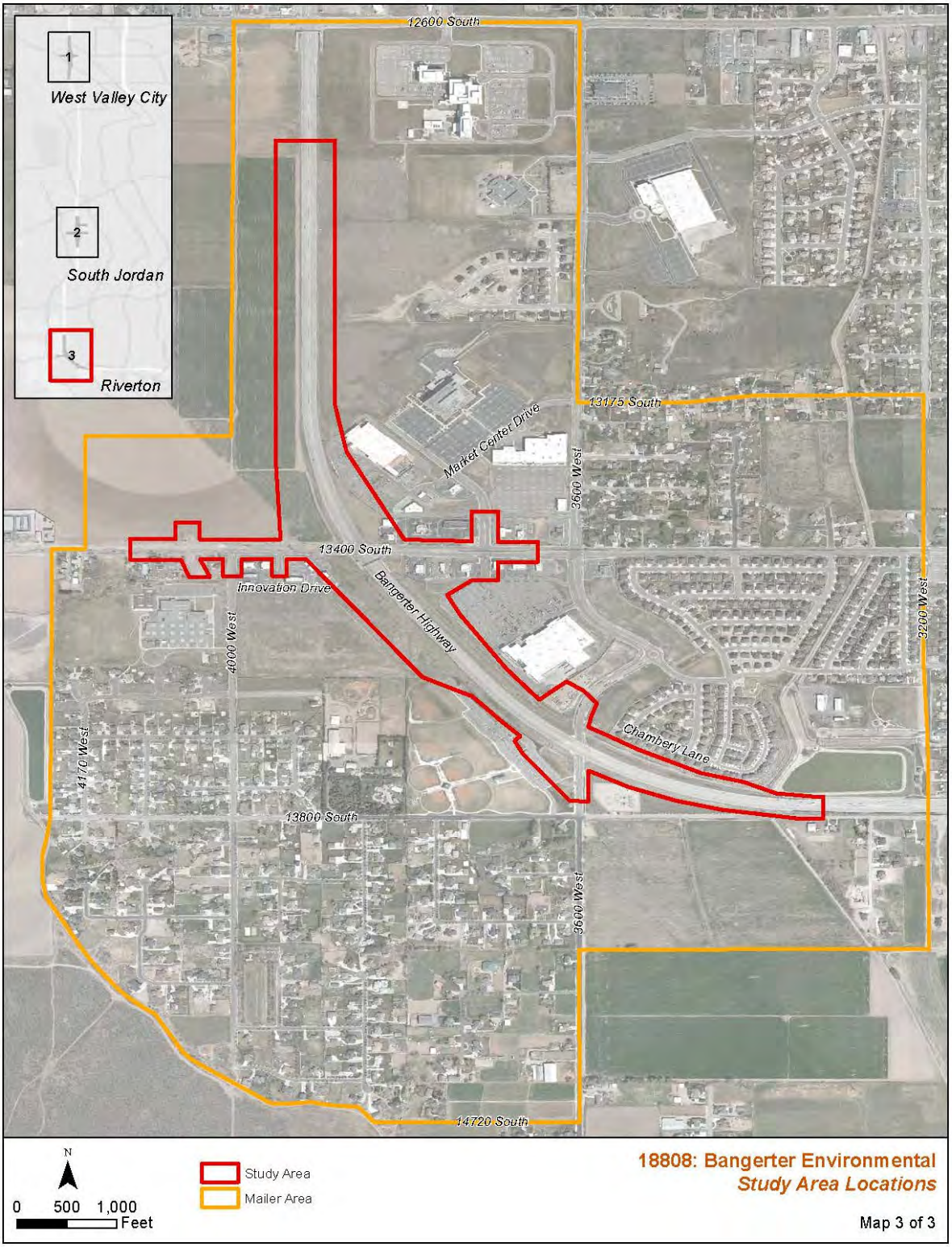


South Hills Middle School meets the Americans with Disabilities Act (ADA) accessibility standards. If you need special accommodations during these meetings, please contact the study team in advance.

Contáctenos también si necesita esta información en Español.

UDOT Bangerter Project ICO HDR
2825 E Cottonwood Pkwy, Ste 200
Cottonwood Heights, 84121-7077

A-2 Mailer Area



A-3 Legal Ad

Via Utah Press Association (https://www.utahlegals.com)



SEARCH PUBLIC NOTICES:

POPULAR SEARCHES

SEARCH KEYWORDS:

13400 South

All Words | Any Words | Exact Phrase

EXCLUDE:

FILTERED BY:

COUNTY Any

CITY Any

PUBLICATION Any

DATE RANGE 6/17/2021 8/16/2021

RESET

The Salt Lake Tribune
Tuesday, July 06, 2021

NOTICE OF PUBLIC MEETING On Proposed Improvements for the Bangerter Highway (S.R. 154) and 13400 South Intersection in Salt Lake County, UT; UDOT Project No. S-0154(92)0 As part of the State Environmental Study, the Utah Department of Transportation (UDOT) advises all interested persons or groups ... **click 'view' to open the full text.**

Deseret News
Tuesday, July 06, 2021

NOTICE OF PUBLIC MEETING

On Proposed Improvements for the
Bangerter Highway (S.R. 154) and 13400 South Intersection
in Salt Lake County, UT;
UDOT Project No. S-0154(92)0

As part of the State Environmental Study, the Utah Department of Transportation (UDOT) advis ... **click 'view' to open the full text.**

The Salt Lake Tribune
Sunday, July 04, 2021

NOTICE OF PUBLIC MEETING On Proposed Improvements for the Bangerter Highway (S.R. 154) and 13400 South Intersection in Salt Lake County, UT; UDOT Project No. S-0154(92)0 As part of the State Environmental Study, the Utah Department of Transportation (UDOT) advises all interested persons or groups ... **click 'view' to open the full text.**

Deseret News
Friday, July 02, 2021

NOTICE OF PUBLIC MEETING On Proposed Improvements for the Bangerter Highway (S.R. 154) and 13400 South Intersection in Salt Lake County, UT; UDOT Project No. S-0154(92)0 As part of the State Environmental Study, the Utah Department of Transportation (UDOT) advises all interested persons or groups ... **click 'view' to open the full text.**

Deseret News
Friday, July 02, 2021

NOTICE OF PUBLIC MEETING

On Proposed Improvements for the
Bangerter Highway (S.R. 154) and 13400 South Intersection
in Salt Lake County, UT;
UDOT Project No. S-0154(92)0

As part of the State Environmental Study, the Utah Department of Transportation (UDOT) advis ... **click 'view' to open the full text.**

The Salt Lake Tribune
Tuesday, June 29, 2021

NOTICE OF PUBLIC MEETING On Proposed Improvements for the Bangerter Highway (S.R. 154) and 13400 South Intersection in Salt Lake County, UT; UDOT Project No. S-0154(92)0 As part of the State Environmental Study, the Utah Department of Transportation (UDOT) advises all interested persons or groups ... **click 'view' to open the full text.**

Deseret News
Tuesday, June 29, 2021

NOTICE OF PUBLIC MEETING

On Proposed Improvements for the
Bangerter Highway (S.R. 154) and 13400 South Intersection
in Salt Lake County, UT;
UDOT Project No. S-0154(92)0

As part of the State Environmental Study, the Utah Department of Transportation (UDOT) advis ... **click 'view' to open the full text.**

The Salt Lake Tribune
Sunday, June 27, 2021

NOTICE OF PUBLIC MEETING On Proposed Improvements for the Bangerter Highway (S.R. 154) and 13400 South Intersection in Salt Lake County, UT; UDOT Project No. S-0154(92)0 As part of the State Environmental Study, the Utah Department of Transportation (UDOT) advises all interested persons or groups ... **click 'view' to open the full text.**

Deseret News
Friday, June 25, 2021

NOTICE OF PUBLIC MEETING On Proposed Improvements for the Bangerter Highway (S.R. 154) and 13400 South Intersection in Salt Lake County, UT; UDOT Project No. S-0154(92)0 As part of the State Environmental Study, the Utah Department of Transportation (UDOT) advises all interested persons or groups ... **click 'view' to open the full text.**

Deseret News
Friday, June 25, 2021

NOTICE OF PUBLIC MEETING

On Proposed Improvements for the
Bangerter Highway (S.R. 154) and 13400 South Intersection
in Salt Lake County, UT;
UDOT Project No. S-0154(92)0

As part of the State Environmental Study, the Utah Department of Transportation (UDOT) advis ... **click 'view' to open the full text.**

Use of this site is governed by our Terms of Use (/Terms-of-Use.aspx) agreement. If you have any questions please send an email to the administrator: brad@utahlegals.com

Select Language

A-4 Social Media



Herriman City Facebook Post 7/7/2021



Riverton City Facebook Post 7/13/2021



Herriman City Facebook Post 7/13/2021



Herriman City Twitter Post 7/13/2021



Riverton City Facebook Post 7/14/2021



UDOT Region Two Twitter Post 7/14/2021

A-5 Email Notification – Environmental List



View this email in your browser

BANGERTER
13400 SOUTH

You're invited! Environmental Study Public Meeting Opportunities

The Utah Department of Transportation (UDOT) has recently started a State Environmental Study (SES) to evaluate a potential freeway-style interchange at Bangerter Highway and 13400 South in order to reduce congestion and improve safety. **The study is scheduled for completion in early 2022, with construction slated for 2023*.**

The study team is hosting two initial public meetings to gather feedback about overall transportation needs and environmental issues that should be considered during the study. Input received will help the team develop and refine the preferred design concept that will be available for comment later in the SES process. For more information and to stay informed about study progress and future public engagement opportunities, visit the study website: udot.utah.gov/bangerter13400south.

Online Presentation and Q&A

When: Tuesday, July 13, 2021
6-7 p.m.

Where: Zoom Webinar
Visit the study website to pre-register and for details on how to join the online meeting.

In-person Open House

When: Wednesday, July 14, 2021
6-7:30 p.m.

Where: South Hills Middle School
13505 S 4000 W
Riverton, UT 84065

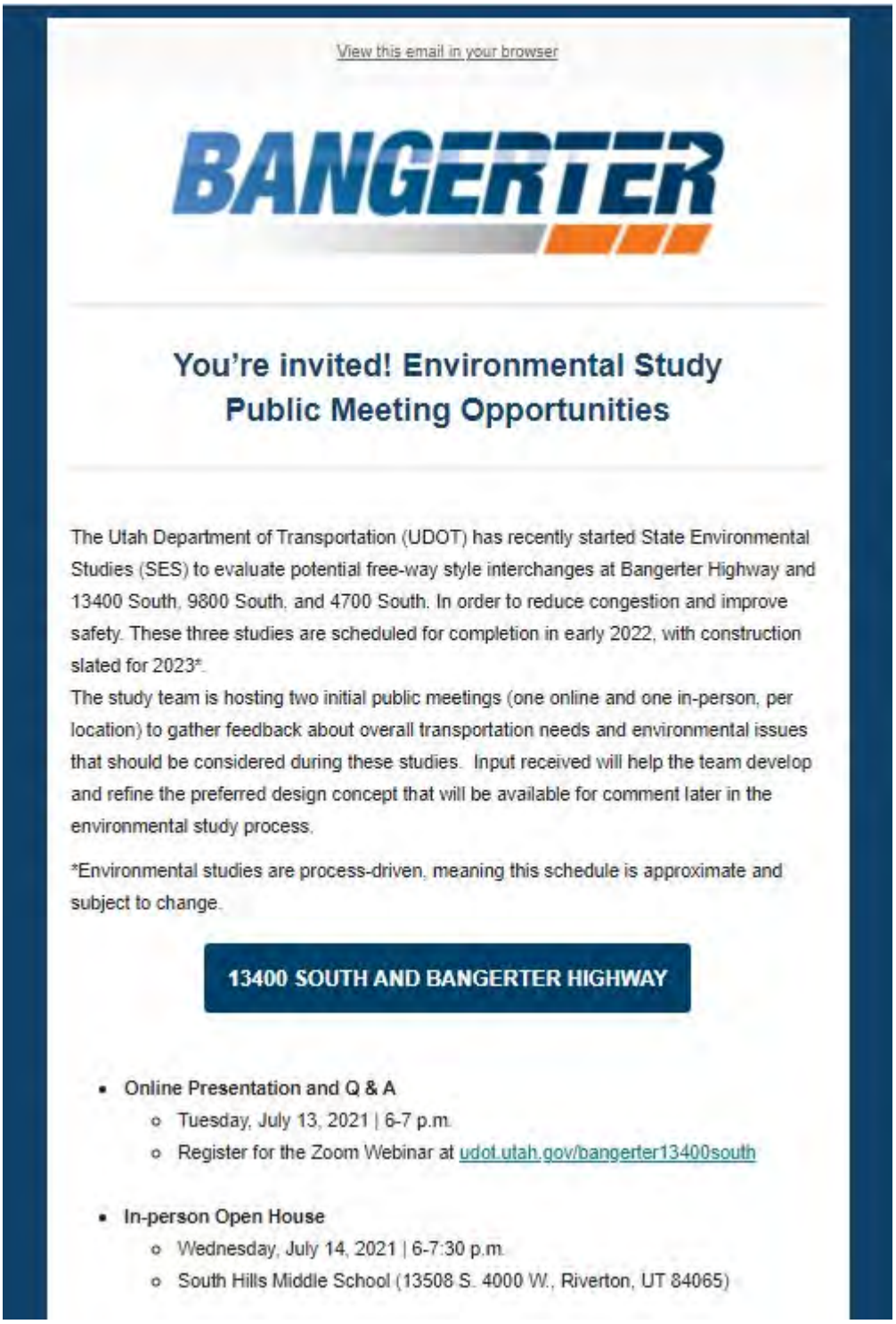
Email Notification – Environmental List



This email was sent to <<Email Address>>
why did I get this? unsubscribe from this list update subscription preferences
UDOT · 2162 W Grove Pkwy Ste 400 · Pleasant Grove, UT 84062-6728 · USA

Email Notification – Environmental List (cont'd)

A-6 Email Notification – Construction List



View this email in your browser

BANGERTER

You're invited! Environmental Study Public Meeting Opportunities

The Utah Department of Transportation (UDOT) has recently started State Environmental Studies (SES) to evaluate potential free-way style interchanges at Bangerter Highway and 13400 South, 9800 South, and 4700 South. In order to reduce congestion and improve safety. These three studies are scheduled for completion in early 2022, with construction slated for 2023*.

The study team is hosting two initial public meetings (one online and one in-person, per location) to gather feedback about overall transportation needs and environmental issues that should be considered during these studies. Input received will help the team develop and refine the preferred design concept that will be available for comment later in the environmental study process.

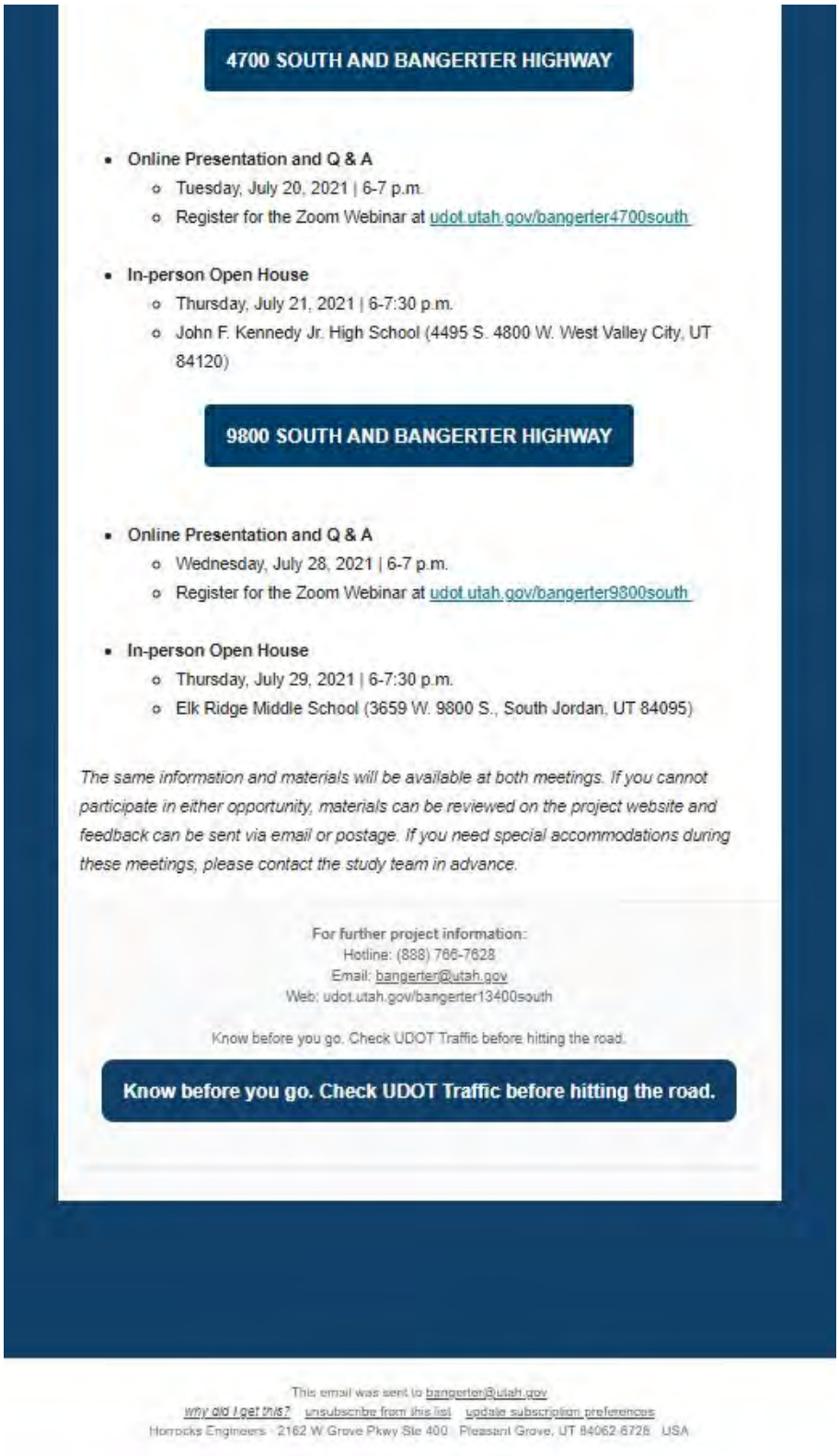
*Environmental studies are process-driven, meaning this schedule is approximate and subject to change.

13400 SOUTH AND BANGERTER HIGHWAY

- Online Presentation and Q & A
  - Tuesday, July 13, 2021 | 6-7 p.m.
  - Register for the Zoom Webinar at udot.utah.gov/bangerter13400south
- In-person Open House
  - Wednesday, July 14, 2021 | 6-7:30 p.m.
  - South Hills Middle School (13508 S. 4000 W., Riverton, UT 84065)

Email notification – Construction List

The initial email notification and the updated email notification are identical.



4700 SOUTH AND BANGERTER HIGHWAY

- Online Presentation and Q & A
  - Tuesday, July 20, 2021 | 6-7 p.m.
  - Register for the Zoom Webinar at udot.utah.gov/bangerter4700south
- In-person Open House
  - Thursday, July 21, 2021 | 6-7:30 p.m.
  - John F. Kennedy Jr. High School (4495 S. 4800 W. West Valley City, UT 84120)

9800 SOUTH AND BANGERTER HIGHWAY

- Online Presentation and Q & A
  - Wednesday, July 28, 2021 | 6-7 p.m.
  - Register for the Zoom Webinar at udot.utah.gov/bangerter9800south
- In-person Open House
  - Thursday, July 29, 2021 | 6-7:30 p.m.
  - Elk Ridge Middle School (3659 W. 9800 S., South Jordan, UT 84095)

The same information and materials will be available at both meetings. If you cannot participate in either opportunity, materials can be reviewed on the project website and feedback can be sent via email or postage. If you need special accommodations during these meetings, please contact the study team in advance.

For further project information:
Hotline: (888) 766-7628
Email: bangerter@utah.gov
Web: udot.utah.gov/bangerter13400south

Know before you go. Check UDOT Traffic before hitting the road.

Know before you go. Check UDOT Traffic before hitting the road.

This email was sent to bangerter@utah.gov
why did I get this? unsubscribe from this list update subscription preferences
Horrocks Engineers · 2162 W Grove Pkwy Ste 400 · Pleasant Grove, UT 84062-6728 · USA

Email Notification – Construction List (cont'd)

A-7 Business Flyer

BANGERTER
13400 SOUTH

YOU'RE INVITED! ENVIRONMENTAL STUDY PUBLIC MEETING OPPORTUNITIES

The Utah Department of Transportation (UDOT) has recently started a State Environmental Study (SES) to evaluate a potential freeway-style interchange at Bangerter Highway and 13400 South in order to reduce congestion and improve safety. The study is scheduled for completion in early 2022, with construction slated for 2023*.

The study team is hosting two initial public meetings to gather feedback about overall transportation needs and environmental issues that should be considered during the study. Input received will help the team develop and refine the preferred design concept that will be available for comment later in the SES process. **For more information and to stay informed about study progress and future public engagement opportunities, visit the study website and sign up for email updates.**

ONLINE PRESENTATION AND Q&A

When: Tuesday , July 13, 2021
6 - 7 p.m.

Where: Zoom Webinar
Visit **udot.utah.gov/bangerter13400south** for information on how to join the online meeting

IN-PERSON OPEN HOUSE

When: Wednesday, July 14, 2021
6 - 7:30 p.m.

Where: South Hills Middle School
13508 S 4000 W
Riverton, UT 84065
(See map on reverse side)

The same information and materials will be available at both meetings. If you cannot participate in either opportunity, materials can be reviewed on the project website and feedback can be sent via email or postage.

**Environmental studies are process-driven, meaning this schedule is approximate and subject to change.*

Hotline: 888-766-ROAD (7623) | **Email:** bangerter@utah.gov | **Website:** udot.utah.gov/bangerter13400South A UDOT PROJECT

In-person Open House Location

Parking is available at South Hills Middle School.



South Hills Middle School meets the Americans with Disabilities Act (ADA) accessibility standards. If you need special accommodations during these meetings, please contact the study team in advance.

Contáctenos también si necesita esta información en Español.

Public Comment Options

The Bangerter 13400 South SES Project Team wants to hear from you! The 30-day public comment period for the Bangerter 13400 South SES Project will close July 28, 2021. You many submit a public comment through the following methods:

Hotline: 888-766-ROAD (7623)

Email: bangerter@utah.gov

Website: udot.utah.gov/bangerter13400south

Mail: Bangerter SES ICO HDR
2825 E Cottonwood Pkwy, Ste 200
Cottonwood Heights, UT 84121

A-8 Website Content



A-9 Press Release Text

UDOT Begins Final Push to Convert Bangerter Highway into a Freeway

State Legislature allocates more than $600 million to advance the effort

Salt Lake City (July X, 2021) - The Utah Department of Transportation (UDOT) recently initiated seven environmental studies needed to convert Bangerter Highway into a freeway. The studies will be completed over the next two years at the following locations along Bangerter Highway:

1. 13400 South in Riverton
2. 9800 South in South Jordan
3. 4700 South in Taylorsville/West Valley City
4. 4100 South in West Valley City
5. 3500 South to S.R. 201 in West Valley City/Salt Lake City
6. California Avenue in Salt Lake City
7. 2700 West in Bluffdale/Riverton

The studies will evaluate environmental impacts associated with potential improvements like new interchanges or frontage roads and will ultimately identify a preferred design at each location that minimizes impacts while still meeting the mobility needs of Bangerter Highway and the local cross-streets. The public will have several opportunities throughout the course of the studies to engage with the study team and provide feedback on the proposed solutions before final decisions are made and the projects move forward to design and construction.

"UDOT is prioritizing the completion of Bangerter Highway to improve safety and mobility along this critical corridor," according to Brian Allen, UDOT Project Manager. "When the freeway is complete and traffic can flow freely without stop lights, we expect to see a significant reduction in crashes and in time driving both north and south on Bangerter Highway and east and west on cross-streets. In fact, traffic projections show that when all is said and done, the time it takes to drive from I-15 in Draper to the Salt Lake International Airport via Bangerter will be reduced by up to 20 minutes," Allen said.

Construction at 13400 South, 4700 South and 9800 South is slated to begin in 2023, and work at 4100 South, California Avenue, and between 3500 South and S.R. 201 is scheduled to start in 2028. Construction funding for 2700 West has not yet been allocated.

The public is invited to participate in the environmental study process through a variety of ways, beginning in July with public open houses for 13400 South, 4700 South and 9800 South. Visit udot.utah.gov/bangerter for more information about these events and to sign up for updates.

-UDOT-

Media Contact:
John Gleason
UDOT Public Information Officer
jgleason@utah.gov
801-560-7740

A-10 Media Coverage

Date	Outlet	Title	Link
Pre-Release Coverage			
8-Jul-21	Herriman City Blog	Bangerter 13400 South Public Meetings	Link
UDOT Press Release Coverage			
12-Jul-21	Gephardt Daily	Plan underway to remove stoplights from Bangerter Highway	Link
12-Jul-21	Daily Utahan	Bangerter Highway Could Become More Like A Freeway, Lose Stoplights	Link
12-Jul-21	DOT News - AASHTO	UDOT Begins Final Push To Make Bangerter Highway More Like A Freeway	Link
12-Jul-21	ABC 4	Efforts underway to remove stoplights from Bangerter Highway	Link
12-Jul-21	UDOT	Final Push to Make Bangerter Highway More Like A Freeway Begins	Link
Bangerter 13400 South Public Meeting Announcement			
13-Jul-21	CBS	Live TV - 12:34 PM	Link
14-Jul-21	FOX	Live TV – 5:06 PM	Link
14-Jul-21	FOX	Live TV – 4:32 PM	Link
14-Jul-21	NBC	Live TV – 12:09 PM	Link
14-Jul-21	NBC	Live TV – 5:20 AM	Link
14-Jul-21	FOX	Live TV – 8:09 AM	Link
Post-Bangerter 13400 South Meeting Coverage			
15-Jul-21	NBC	Live TV – 6:37 PM	Link
15-Jul-21	NBC	Live TV – 5:37 PM	Link
15-Jul-21	KSL	Live TV – 12:53 PM	Link

Appendix B: Attendance

B-1 Online Attendee Report

Attendee Report

Report Ger ########

Topic	Webinar IC	Actual Star	Actual Dur	# Registere	# Cancellec	Unique Vie	Total Users	Max Concurrent Views
Bangerter	844 3809 5	########	90	75	0	47	67	0

Host Details

Attended	User Name	Email	Join Time	Leave Time	Time in Ses	Country/Region Name
Yes	Macey Mo	katiek@ho	########	########	90	[redacted]

Panelist Details

Attended	User Name	Email	Join Time	Leave Time	Time in Ses	Country/Region Name
Yes	Eric Lyon (I	[redacted]	########	########	88	[redacted]
Yes	Gray Thom	[redacted]	########	########	88	[redacted]
Yes	Amy Croft	[redacted]	########	########	87	[redacted]
Yes	Duke Richa	[redacted]	########	########	87	[redacted]
Yes	Ivan Hoope	[redacted]	########	########	86	[redacted]
Yes	Naomi Kise	[redacted]	########	########	85	[redacted]
Yes	Brian Allen	[redacted]	########	########	84	[redacted]
Yes	John Blume	[redacted]	########	########	83	[redacted]
Yes	Brian Atkin	[redacted]	########	########	78	[redacted]
Yes	Marwan	[redacted]	########	########	78	[redacted]
Yes	Melissa	[redacted]	########	########	77	[redacted]
Yes	Tyler Allen	[redacted]	########	########	72	[redacted]

Attendee Details

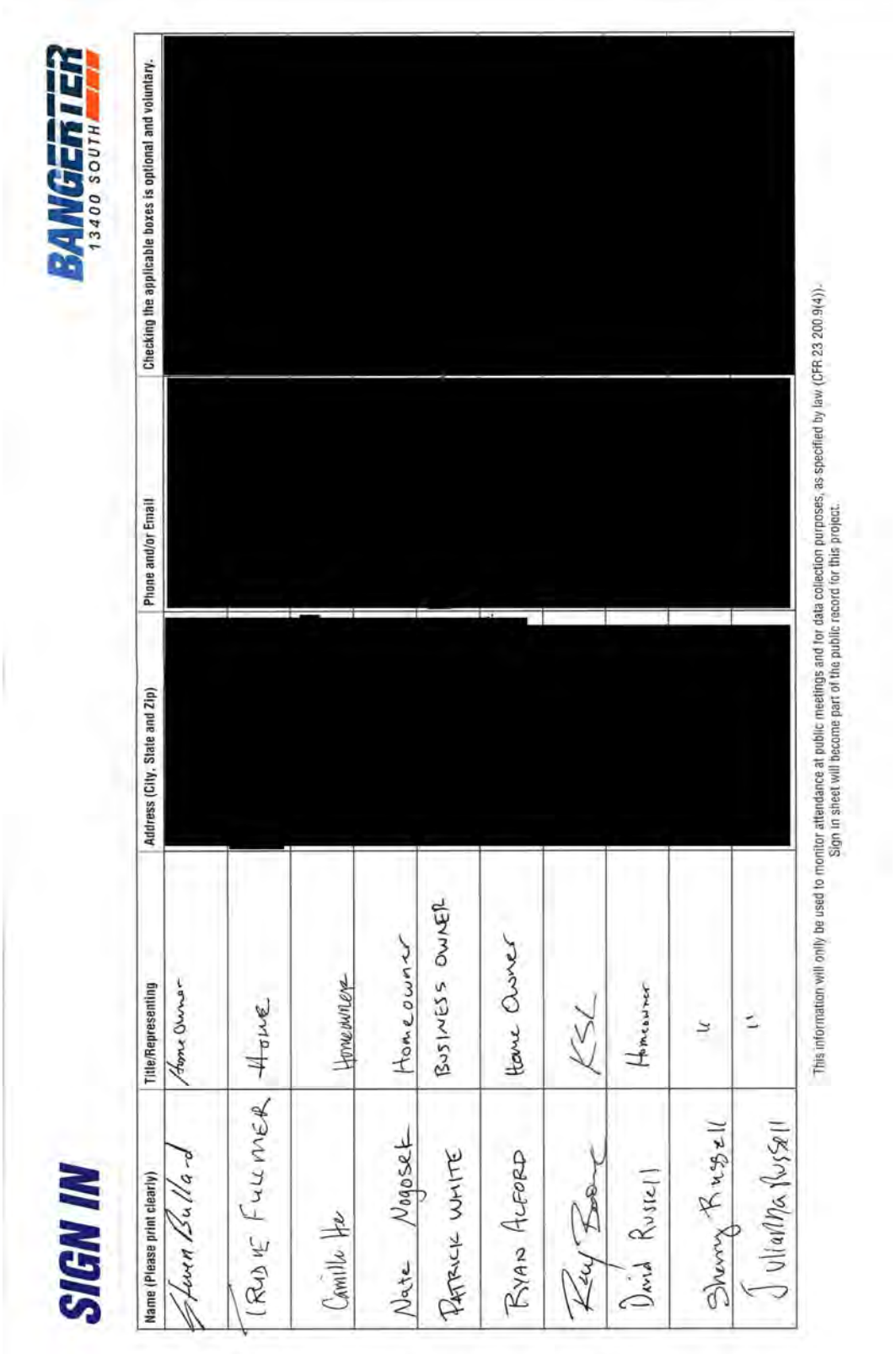
Attended	User Name	First Name	Last Name	Email	Registratio	Approval S	Join Time	Leave Time	Time in Ses	What is yo	What is yo	Are you a p	Country/Region Name	
No	Walt	Walt	Parker	[redacted]	########	approved	--	--	--	[redacted]	[redacted]	No		
Yes	Heather M	Heather	Mickelson	[redacted]	########	approved	########	########	41	[redacted]	[redacted]	No	[redacted]	1
Yes	Mardi Pear	Mardi	Pearson	[redacted]	########	approved	########	########	56	[redacted]	[redacted]	No	[redacted]	1
No	Jared	Jared	Belcher	[redacted]	########	approved	--	--	--	[redacted]	[redacted]			
Yes	Dave Selin	Dave	Selin	[redacted]	########	approved	########	########	47	[redacted]	[redacted]	No	[redacted]	1
Yes	Colton Mer	Colton	Merchant	[redacted]	########	approved	########	########	12	[redacted]	[redacted]		[redacted]	1
No	Alex	Alex	Earl	[redacted]		approved	--	--	--	[redacted]	[redacted]	No		
Yes	michael ric	michael	richardson	[redacted]	#	approved	########	########	17	[redacted]	[redacted]	No	[redacted]	1
Yes	michael ric	michael	richardson	[redacted]	com		########	########	19				[redacted]	
No	Max	Max	Jenkins	[redacted]		approved	--	--	--	[redacted]	[redacted]	No		
Yes	Ty Vranes	Ty	Vranes	[redacted]	########	approved	########	########	23	[redacted]	[redacted]	No	[redacted]	1
No	Terry	Terry	Williams	[redacted]	########	approved	--	--	--	[redacted]	[redacted]	No		
No	Jeffrey	Jeffrey	Cook	[redacted]	########	approved	--	--	--	[redacted]	[redacted]	No		
No	Susan	Susan	Parker	[redacted]	########	approved	--	--	--	[redacted]	[redacted]	No		
No	Sherion	Sherion	Maughan	[redacted]		approved	--	--	--	[redacted]	[redacted]	No		
No	Robert	Robert	Stewart	[redacted]	########	approved	--	--	--	[redacted]	[redacted]	No		
Yes	Daniel Cha	Daniel	Chadwell	[redacted]		approved	########	########	56	[redacted]	[redacted]	No	[redacted]	1
No	Kimo	Kimo	Pickering	[redacted]	########	approved	--	--	--	[redacted]	[redacted]	No		
Yes	Tony Skanc	Tony	Skanchy	[redacted]		approved	########	########	39	[redacted]	[redacted]	No	[redacted]	1
Yes	Cameron V	Cameron	Willes	[redacted]	########	approved	########	########	8	[redacted]	[redacted]	No	[redacted]	1
Yes	Scott Henir	Scott	Heninger	[redacted]	########	approved	########	########	8	[redacted]	[redacted]	No	[redacted]	1
Yes	Scott Henir	Scott	Heninger	[redacted]	.com		########	########	12				[redacted]	
Yes	Daniel Johr	Daniel	Johnson	[redacted]	########	approved	########	########	22	[redacted]	[redacted]	No	[redacted]	1
No	Adam	Adam	Taylor	[redacted]	########	approved	--	--	--	[redacted]				
Yes	Ryan Pitts	Ryan	Pitts	[redacted]	########	approved	########	########	45	[redacted]	[redacted]	No	[redacted]	1
No	Jessica	Jessica	Ibarra	[redacted]	########	approved	--	--	--	[redacted]		No		
Yes	Daniel Mc	Daniel	McCay	[redacted]	########	approved	########	########	18	[redacted]	[redacted]	No	[redacted]	1
No	GREGORY	GREGORY	BARBIERI	[redacted]	########	approved	--	--	--	[redacted]	[redacted]	No		
Yes	Trevor Hac	Trevor	Hackett	[redacted]	########	approved	########	########	38	[redacted]	[redacted]	No	[redacted]	1
Yes	David Nels	David	Nelson	[redacted]	########	approved	########	########	17	[redacted]	[redacted]	No	[redacted]	1
Yes	Eric Goebe	Eric	Goebel	[redacted]	########	approved	########	########	57	[redacted]	[redacted]		[redacted]	1
Yes	Shad Pulley	Shad	Pulley	[redacted]	########	approved	########	########	18				[redacted]	1
Yes	Jon Gilchris	Jon	Gilchrist	[redacted]	########	approved	########	########	56	[redacted]	[redacted]	No	[redacted]	1
Yes	Lisa Wilson	Lisa	Wilson	[redacted]	########	approved	########	########	55	[redacted]	[redacted]	No	[redacted]	1
Yes	Megan Cox	Megan	Cox	[redacted]	########	approved	########	########	19	[redacted]	[redacted]	No	[redacted]	1
Yes	sam richey	sam	richey	[redacted]	########	approved	########	########	57	[redacted]	[redacted]	Yes	[redacted]	1
Yes	Becky Cond	Becky	Condie	[redacted]	########	approved	########	########	30	[redacted]	[redacted]	No	[redacted]	1
Yes	Kyle Coles	Kyle	Coles	[redacted]	########	approved	########	########	50	[redacted]	[redacted]	No	[redacted]	1
Yes	Matt Bowl	Matt	Bowles	[redacted]	########	approved	########	########	27	[redacted]	[redacted]	No	[redacted]	1
No	David	David	Midgley	[redacted]	########	approved	--	--	--	[redacted]	[redacted]	No		
No	Dan	Dan	Leavitt	[redacted]	########	approved	--	--	--	[redacted]	[redacted]	No		
Yes	Scott Manc	Scott	Mancuso	[redacted]		approved	########	########	4	[redacted]	[redacted]	No	[redacted]	1
No	Jesica	Jesica	Lee	[redacted]	########	approved	--	--	--	[redacted]	[redacted]	No		
Yes	Mark B	Mark	B	[redacted]	########	approved	########	########	56	[redacted]	[redacted]	No	[redacted]	1
Yes	Dustin Belr	Dustin	Belnap	[redacted]	########	approved	########	########	51	[redacted]	[redacted]	No	[redacted]	1
Yes	Gavin Pehr	Gavin	Pehrson	[redacted]		approved	########	########	56	[redacted]	[redacted]	No	[redacted]	1
Yes	David Cox	David	Cox	[redacted]	########	approved	########	########	57	[redacted]	[redacted]		[redacted]	1
Yes	Coby Wilso	Coby	Wilson	[redacted]	########	approved	########	########	54	[redacted]	[redacted]	No	[redacted]	1
Yes	Robyn Hac	Robyn	Hackett	[redacted]	########	approved	########	########	54	[redacted]	[redacted]	No	[redacted]	1
Yes	Matt Week	Matt	Weeks	[redacted]		approved	########	########	56	[redacted]	[redacted]	No	[redacted]	1
Yes	Mandy Plit	Mandy	Plitt	[redacted]	########	approved	########	########	1	[redacted]	[redacted]	No	[redacted]	1
Yes	Mandy Plit	Mandy	Plitt	[redacted]	@gmail.com		########	########	9				[redacted]	
No	Gary	Gary	Richardson	[redacted]	########	approved	--	--	--	[redacted]	[redacted]	No		

Online Presentation Attendance Report

Yes	Taylor Lea	Taylor	Leavitt	[redacted]@p	########	approved	########	########	14	[redacted]	[redacted]	No	[redacted]	1
Yes	Emi	Emi		[redacted]	########	approved	########	########	48	[redacted]	[redacted]	No	[redacted]	1
Yes	Trace Robi	Trace	Robinson	[redacted]	########	approved	########	########	22	[redacted]	[redacted]	No	[redacted]	1
No	Norman	Norman	Sackett	[redacted]		approved	--	--	--	[redacted]	[redacted]	No		
No	Michael	Michael	Fazio	[redacted]@bl	########	approved	--	--	--	[redacted]	[redacted]	No		
Yes	Bill Provost	Bill	Provost	[redacted]	########	approved	########	########	55	[redacted]	[redacted]	Yes	[redacted]	1
Yes	Jason Hutc	Jason	Hutchison	[redacted]@hut	########	approved	########	########	56	[redacted]	[redacted]	No	[redacted]	1
Yes	Jason Hutc	Jason	Hutchison	[redacted]			########	########	12				[redacted]	
Yes	Kory Yeage	Kory	Yeager	[redacted]	########	approved	########	########	13	[redacted]	[redacted]	No	[redacted]	1
No	Andy	Andy	Lovell	[redacted]	########	approved	--	--	--					
Yes	Denis Clays	Denis	Clayson	[redacted]	########	approved	########	########	52	[redacted]	[redacted]	Yes	[redacted]	1
No	Morgen	Morgen	Baldwin	[redacted]		approved	--	--	--	[redacted]	[redacted]	No		
No	Jess	Jess	Wenner	[redacted]		approved	--	--	--	[redacted]	[redacted]	No		
No	Ryan	Ryan	Carter	[redacted]@	########	approved	--	--	--	[redacted]		No		
No	Jacob	Jacob	Newkirk	[redacted]	########	approved	--	--	--	[redacted]	[redacted]	No		
Yes	Ashley Tillr	Ashley	Tillman	[redacted]	########	approved	########	########	3	[redacted]		No	[redacted]	1
Yes	Ashley Tillr	Ashley	Tillman	[redacted]@[redacted].com			########	########	25				[redacted]	
No	Justin	Justin	Lynch	[redacted]@	########	approved	--	--	--	[redacted]	[redacted]	No		
Yes	Justin Bedc	Justin	Beddoes	[redacted]@	[redacted]	approved	########	########	56	[redacted]	[redacted]	No	[redacted]	1
No	Andrea	Andrea	Guevara	[redacted]	########	approved	--	--	--	[redacted]	[redacted]	No		
No	Tim	Tim	Marti	[redacted]	########	approved	--	--	--					
Yes	Grady How	Grady	Howell	[redacted]	########	approved	########	########	57	[redacted]	[redacted]		[redacted]	1
Yes	Nicholle Vc	Nicholle	Voshell	[redacted]	########	approved	########	########	56	[redacted]	[redacted]	No	[redacted]	1
Yes	Thad Van R	Thad	Van Ry	[redacted]@	[redacted]	approved	########	########	1	[redacted]	[redacted]	No	[redacted]	1
Yes	Thad Van R	Thad	Van Ry	[redacted]@[redacted].com			########	########	27				[redacted]	
No	CURTIS	CURTIS	OSTLER	[redacted]	########	approved	--	--	--	[redacted]	[redacted]	No		
Yes	Justin Rhoc	Justin	Rhodes	[redacted]	########	approved	########	########	8				[redacted]	1
Yes	Michael Hi	Michael	Higginson	[redacted]	[redacted]	approved	########	########	29	[redacted]	[redacted]		[redacted]	1
Other Attended														47
User Name	Join Time	Leave Time	Time in Ses	Country/Region Name										
1 8E+10	########	########	27	[redacted]										

Online Presentation Attendance Report (cont'd)

B-2 In-Person Public Meeting Sign In Sheets



BANGERTER 13400 SOUTH

SIGN IN

Name (Please print clearly)	Title/Representing	Address (City, State and Zip)	Phone and/or Email	Checking the applicable boxes is optional and voluntary.
Shawn Bullard	Home Owner	[redacted]	[redacted]	[redacted]
TRUDIE FULMER	HOME			
Camille Hu	Homeowner			
Nate Nogosek	Homeowner			
PATRICK WHITE	BUSINESS OWNER			
RYAN ALFORD	Home Owner			
Kay Bone	KSL			
David Russell	Homeowner			
Sherry Russell	"			
J Williams Russell	"			

This information will only be used to monitor attendance at public meetings and for data collection purposes, as specified by law (CFR 23 200.9(4)).
Sign in sheet will become part of the public record for this project.

SIGN IN

BANGERTER 13400 SOUTH

Name (Please print clearly)	Title/Representing	Address (City, State and Zip)	Phone and/or Email	Checking the applicable boxes is optional and voluntary.
Amy Rose	Homeowner / Self	[redacted]	[redacted]	[redacted]
Mike Rose	"			
———	———			
Marcus Johnson	Homeowner			
Dustin Whitaker Candice Woodward	Home owner			
Julie Burton	Home Owner			
Natalia Brown	Resident			
Di He	Homeowner			
Jason Hutchison	Home Owner			
Cliff Strachan	Resident			

This information will only be used to monitor attendance at public meetings and for data collection purposes, as specified by law (CFR 23 200.9(4)).
Sign In sheet will become part of the public record for this project.

SIGN IN

BANGERTER 13400 SOUTH

Name (Please print clearly)	Title/Representing	Address (City, State and Zip)	Phone and/or Email	Checking the applicable boxes is optional and voluntary.
Nicki Bullard	Homeowner	[redacted]	[redacted]	[redacted]
Tonya Hutchison	Homeowner			
Robert Stewart	UDOT			
KIRK WOOLLEY	HOME OWNER			
STUART Richardson	None			
Charlie Wallwork				
Roberto May				
Tony Stanchy	Business			
Lauri Smith	Homeowner			

This information will only be used to monitor attendance at public meetings and for data collection purposes, as specified by law (CFR 23 200.9(4)).
Sign In sheet will become part of the public record for this project.

BANGERTER
13400 SOUTH

SIGN IN

Name (Please print clearly)	Title/Representing	Address (City, State and Zip)	Phone and/or Email	Checking the applicable boxes is optional and voluntary.
Mike Nicol		[redacted]	[redacted]	[redacted]
Tim Mayes	—			
Marylee Wallwork	Business Owner			
Eric Hannon	"			
Jennifer Plowman	"			
Ana Vazquez	Investment			
Ryan Griggs				

This information will only be used to monitor attendance at public meetings and for data collection purposes, as specified by law (CFR 23 200.9(4)).
Sign in sheet will become part of the public record for this project.

SIGN IN

BANGERTER 13400 SOUTH

Name (Please print clearly)	Title/Representing	Address (City, State and Zip)	Phone and/or Email	Checking the applicable boxes is optional and voluntary.
Cole Strong	—	[redacted]	[redacted]	[ ] Male [ ] Female [ ] Person with Disability [ ] American Indian/Alaskan Native [ ] Asian/Pacific Islander [ ] Black [ ] White [ ] Hispanic [ ] Other
				[ ] Male [ ] Female [ ] Person with Disability [ ] American Indian/Alaskan Native [ ] Asian/Pacific Islander [ ] Black [ ] White [ ] Hispanic [ ] Other
				[ ] Male [ ] Female [ ] Person with Disability [ ] American Indian/Alaskan Native [ ] Asian/Pacific Islander [ ] Black [ ] White [ ] Hispanic [ ] Other
				[ ] Male [ ] Female [ ] Person with Disability [ ] American Indian/Alaskan Native [ ] Asian/Pacific Islander [ ] Black [ ] White [ ] Hispanic [ ] Other
				[ ] Male [ ] Female [ ] Person with Disability [ ] American Indian/Alaskan Native [ ] Asian/Pacific Islander [ ] Black [ ] White [ ] Hispanic [ ] Other
				[ ] Male [ ] Female [ ] Person with Disability [ ] American Indian/Alaskan Native [ ] Asian/Pacific Islander [ ] Black [ ] White [ ] Hispanic [ ] Other
				[ ] Male [ ] Female [ ] Person with Disability [ ] American Indian/Alaskan Native [ ] Asian/Pacific Islander [ ] Black [ ] White [ ] Hispanic [ ] Other
				[ ] Male [ ] Female [ ] Person with Disability [ ] American Indian/Alaskan Native [ ] Asian/Pacific Islander [ ] Black [ ] White [ ] Hispanic [ ] Other
				[ ] Male [ ] Female [ ] Person with Disability [ ] American Indian/Alaskan Native [ ] Asian/Pacific Islander [ ] Black [ ] White [ ] Hispanic [ ] Other
				[ ] Male [ ] Female [ ] Person with Disability [ ] American Indian/Alaskan Native [ ] Asian/Pacific Islander [ ] Black [ ] White [ ] Hispanic [ ] Other

This information will only be used to monitor attendance at public meetings and for data collection purposes, as specified by law (CFR 23 200.9(4)).
Sign In sheet will become part of the public record for this project.

Appendix C: Meeting Materials

C-1 – Online Presentation and Q&A Script

Bangerter Environmental | 13400 South
Online Public Meeting Presentation Talking Points

1. Welcome – Gray
    - Hello and welcome to the Online Public Meeting for the Bangerter and 13400 South State Environmental Study, or SES.
    - Tonight, you'll hear from members of the Environmental Study team about the initial phase of the SES at this location, what we'll be looking at throughout this study, and how you can provide input to help inform the process.
    - We'll be getting started with the presentation in just a few minutes. We'd like to give people a chance to join before we begin. The presentation itself will take roughly 20 minutes, and we'll use the remaining time to address any questions.
    - We have a group of panelists from our study team on the line and ready to answer any of your questions about this environmental study.

2. Q&A - You'll see a Q&A button at the bottom of your Zoom screen. As we go through the presentation, feel free to submit questions for our team to address verbally when the presentation is complete. A few things to note:
        - Everyone in the meeting will be able to see the questions submitted.
        - You can also "like" someone else's question using the "thumbs up" icon next to that question. Each "like" moves that question up on the list.
        - When we get to the Q&A portion of the meeting, our moderators will start with the questions that have the most "likes".
    - Okay – it's 6:05 p.m., let's go ahead and get started. I'm going to pass things over to Brian Allen with UDOT, the Project Manager for this effort.

3. Presenters – Brian Allen / Tyler Allen
    - BA: Hello everyone – my name is Brian Allen, and I am the UDOT Project Manager overseeing the Bangerter Environmental Studies.
    - BA: My co-presenter today is Tyler, and I'll let him introduce himself.
    - TA: Hi everyone – I'm Tyler Allen with UDOT Environmental, helping to oversee the Bangerter Environmental Studies.

4. Meeting Purpose – Brian Allen
    - I am sure many, if not all of you, are familiar with the progress that has been made on Bangerter Highway over the last 10 years.
    - Continuing that progress, UDOT has recently started a State Environmental Study to evaluate a freeway-style interchange at all current signalized intersections on Bangerter Highway. Tonight's meeting is focused on Bangerter and 13400 South.

- The purpose of tonight's meeting, along with tomorrow's in-person option, is to introduce the study to the public and gather feedback about the overall transportation needs and environmental issues that should be considered as we move through this process.
- The input received during these meetings will help the team develop and refine the preferred design concept that will be available for comment later in the study process.
- We are holding two meetings to provide people with a couple of options to engage with us at this early point in the study. One right now, online, and one tomorrow in person. The same information and materials will be available at both meetings. Additionally, the recording of tonight's online meeting will be available on the study website tomorrow for anyone who may want to review it or share it with others.

5. State Environmental Study (SES) – Tyler Allen
    - The study at 13400 South and Bangerter Highway is a State Environmental Study, or an SES.
    - An SES is a state-funded environmental study that includes an environmental review and documentation of public involvement activities.
    - The environmental review process for state projects provides decision-makers with the necessary information to make the best project decisions while carefully considering the anticipated benefits and impacts.
    - This process begins with the Scoping phase. During the scoping phase, which is where we are now, we initiate agency coordination and public involvement activities, where we gather information about the area, resources, and begin gathering traffic data. This helps establish study goals. The Scoping process is followed by the development of design concepts and screening metrics to determine possible solutions based on the information found during the Scoping phase.
    - The design concepts are then screened for a variety of things like:
        - Ability to meet the project goals
        - Potential impact to natural and built resources
        - Engineering considerations and cost
    - Once a particular design concept looks goes through the screening process and is selected as the preferred design concept, our team evaluates the environmental resources within and adjacent to the impact area of that design concept. At this point the SES document can be drafted.
        - When the draft is ready, we'll hold a Public Hearing to give the public a chance to review the study findings and offer any additional feedback for our team to address.
    - Once everything has been completed, and all requirements have been met, the SES will be finalized.
        - Once this area has been environmentally cleared, we can move on to the next phase of this effort, which is design and then construction.
    - Tonight's meeting is the first of many points of contact you can expect to see from our team throughout this environmental study. Make sure to visit our website

udot.utah.gov/Bangerter13400South and sign up for updates, if you haven't already, to make sure you are receiving the latest and greatest information.

- As always, feel free to reach out to our team at any point throughout the study.

6. Study Goals – Brian Allen
    - The purpose of this project is to improve safety and increase mobility. The current scope is to replace the traffic signals at 13400 south with a freeway-style interchange. Grade separating these facilities will:
        - Reduce travel time for drivers on Bangerter, and 13400 south.
        - Reduce the number and severity of crashes by eliminating high-speed conflict points.

7. Traffic– Brian Allen
    - It is no secret that Utah is growing. By 2050 (the design year for this study) traffic is expected to double from the current rate of 70,000 cars to 140,000 cars per day.
    - Without making major improvements on Bangerter, projections have estimated that delays could increase by nearly four times.

8. Study Area – Tyler Allen
    - The study area shows the limits of where our team will look to investigate environmental impacts as part of this work.
    - It's important to note – the lines drawn are an approximate estimation of the limits of this study area. Environmental studies are variable and subject to change, so it's possible these limits will expand or possible shrink as we get further along in the process.
    - This is really just to give you an idea of the general area that our team will consider as part of this specific study.
    - As part of this process, we will look at different environmental resources that could be impacted by different alternatives.
        - Things like noise, etc. etc.

9. Schedule – Brian Allen
    - This slide shows the environmental schedule and accompanying milestones. The orange represents environmental milestones and the gray is coordination milestones with the public. The meetings shown here are official public meetings, but you can always get in touch the team through the hotline, website, email, or even traditional mail.
    - Schedule overview
        - Right now we are in the middle of the chart, completing open houses and developing concepts

- The next phase will include neighborhood meetings to notify impacted residents and answer any questions
- We then move to the public hearing portion of the process
- Environmental study ends in Spring 2022
- Contractor procurement and ROW acquisition as needed will run from Spring 2022 – Spring 2023
- Estimated construction start in Spring 2023 and typically takes 2 years to complete

10. Pedestrian Crossing – Brian Allen
    - One unique feature of this intersection is the pedestrian crossing over Bangerter.
    - This structure is going to be impacted if any major roadway changes are made at the intersection.
    - As part of this study, our team will be looking at the best way to accommodate pedestrians in the future.
        - Part of our job during this study is to look at options like relocating the crossing at another area or even moving it to cross 13400 South, instead of Bangerter Highway.
    - Overall, our goal with the crossing is to ensure kids, bicyclists and any other pedestrians can travel safely.
        - We're working closely with local schools, parents, and the Jordan School District to figure out the best option.
        - This is another area we'd love to hear your feedback on. How do you and the other members of your community use the bridge? Let us know!

11. Possible Solutions – Brian Allen
    - We are still in the very early stages of this environmental study, so we are hoping to hear what is important to you to help us determine what solution makes the most sense here at 13400 South.
    - Here are some possible concepts that our team plans to investigate as a next step in the study.
    - Mention over/under, SPUI and tight diamond options.

12. Public Comment / Communication Channels – Tyler Allen
    - Now that you've heard what we are looking at, please let us know what you think!
    - We have a variety of outreach channels set up to allow you to provide feedback, and welcome input at any point throughout the study.
    - We do, however, have our first formal comment period, open now through July 28. What that means is any comment received during this period will be included in the final environmental document. There will be another chance to provide formal input later on in the study when a preferred concept has been developed.
    - Call, email, visit our website, mail in a comment form.

- Tell us how you use these roads – do you walk, drive, bike in the area? We want to know about it. We're also looking for information about potential environmental considerations we should address with this study and project as well.
- We are looking for any and all feedback so we can make sure the solution developed is the right fit for this area.

13. Q&A – Gray
    - Thanks so much for that info Brian and Tyler.
    - We've been keeping an eye on the questions coming in, and now that we've finished up the presentation, we want to jump right into the Q&A portion of the meeting. And just as a notice: questions submitted will not be considered formal public comment.
    - As a reminder: you are unable to ask questions verbally during this meeting. You may submit any questions you'd like answered via the Q&A button on the bottom of your screen.
    - The "thumbs up" icon next to each question moves that up the list and tells us you'd like that question answered too.
    - We'll try and get through as many questions as we can before the meeting ends at 7 p.m. – if we aren't able to get to your question, please reach out via our hotline, email, or website and we will make sure to get you an answer.
    - We also have the in-person meeting tomorrow night from 6 – 7:30 p.m. at South Hills Middle School where we'll have this same info along with members of the study team in-person to answer any questions you may have.

[Live Q&A Session]

<u>After Q&A Session (6:58 p.m.)</u>

14. Public Comment / Communication Channels – Gray
    - Thanks so much everyone for joining us tonight for the Bangerter Highway and 13400 South State Environmental Study online public meeting!
    - We appreciate your time and your feedback.
    - Please do not hesitate to reach out to us via these channels at any time and make sure to submit public comments by July 28th.
    - This meeting recording will be posted to the study website tomorrow for review or to share with your friends and neighbors.

15. In-Person Public Open House – Gray
    - As a reminder, we do have an in-person Open House tomorrow night at South Hills Middle School.
    - If you have any additional questions or would like to meet the study team, we'll be there from 6 – 7:30 p.m.
    - Goodnight!

C-2 – Online Presentation and Q&A Slides

BANGERTER

WELCOME

ONLINE PUBLIC MEETING

Bangerter | 13400 South State Environmental Study (SES)

The meeting will begin shortly after 6 p.m. to allow participants time to join the Zoom webinar. Please visit the study website at **udot.utah.gov/bangerter13400south** to access supporting materials for today's presentation.

To submit questions, click the Q&A button on your screen. Our study team will be monitoring the questions and will answer as many as possible following the presentation.

Please note, this event is being recorded and will be available for viewing at **udot.utah.gov/bangerter13400south**.

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Q&A

BANGERTER

1. TO SUBMIT A QUESTION

Click on the Q&A button at the bottom of the screen

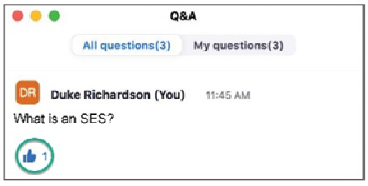


Type question in the Q&A Window



2. TO LIKE OR UPVOTE A QUESTION

Click on the "thumbs-up- botton underneath questions



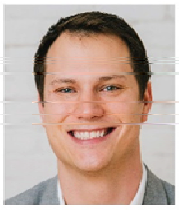
This helps us to know how many people have the same question



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PRESENTERS

BANGERTER



Brian Allen, P.E.
UDOT Project Manager



Tyler Allen
UDOT Environmental

A UDOT PROJECT

MEETING PURPOSE

BANGERTER

The study team is hosting two initial public meetings, one in-person and one online, to gather feedback about overall transportation needs and environmental issues that should be considered during the study.

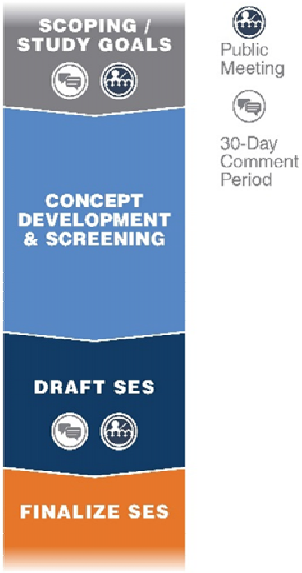
Input received during these meetings will help the team develop and refine the preferred design concept that will be available for comment later in the SES process.



A UDOT PROJECT

STATE ENVIRONMENTAL STUDY (SES)

BANGERTER



A UDOT PROJECT

STUDY GOALS

BANGERTER



Convert all remaining at-grade intersections on Bangerter Highway to grade-separated interchanges, or other freeway-like solutions.

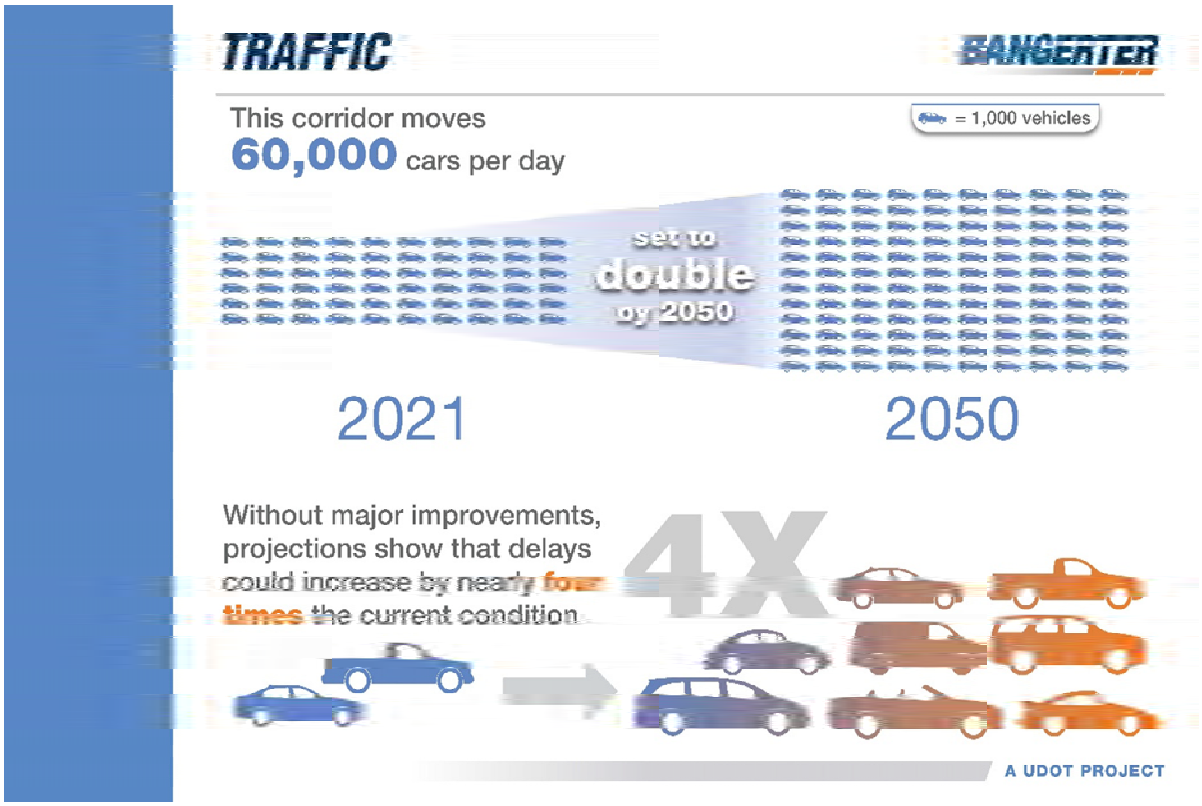


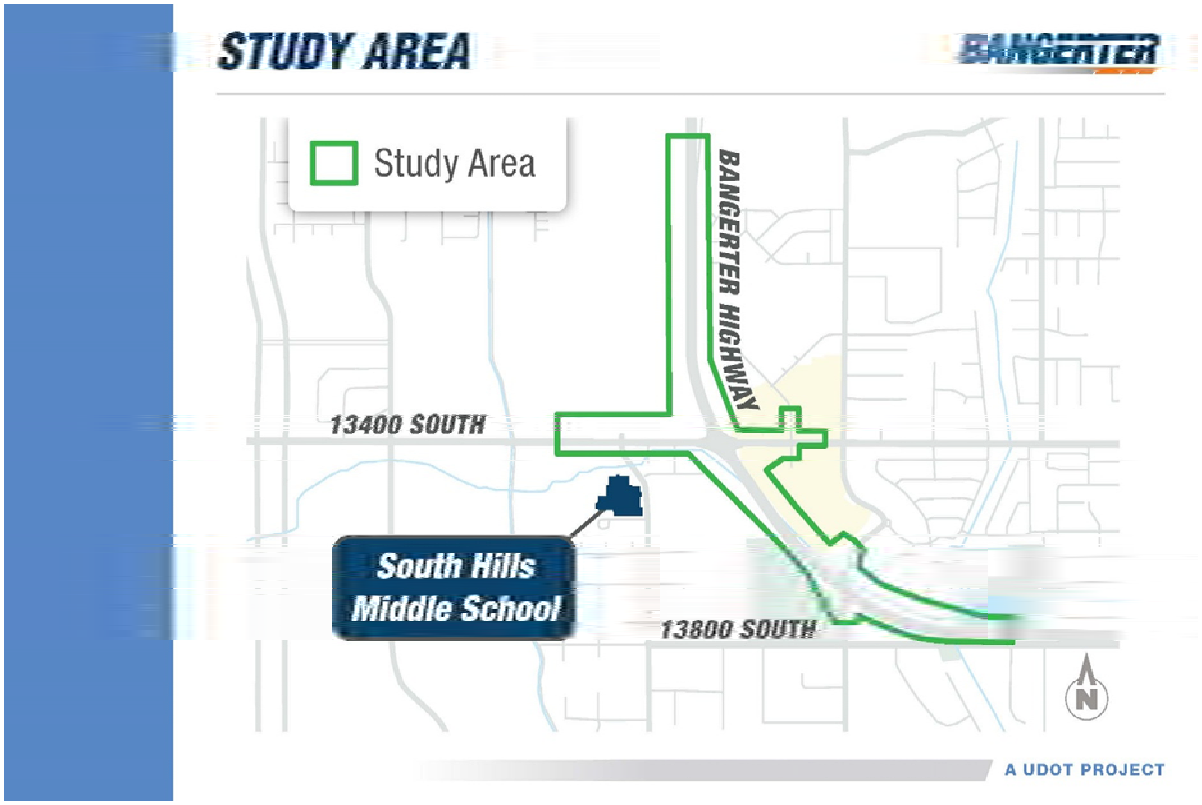
Enhance safety.



Improve travel times and increase mobility.

A UDOT PROJECT


TRAFFIC
BANGERTER
This corridor moves
60,000 cars per day
= 1,000 vehicles
set to
double
by 2050
2021
2050
Without major improvements, projections show that delays could increase by nearly four times the current condition
4X
A UDOT PROJECT


STUDY AREA
BANGERTER
Study Area
BANGERTER HIGHWAY
13400 SOUTH
South Hills Middle School
13800 SOUTH
N
A UDOT PROJECT

SCHEDULE

BANGERTER

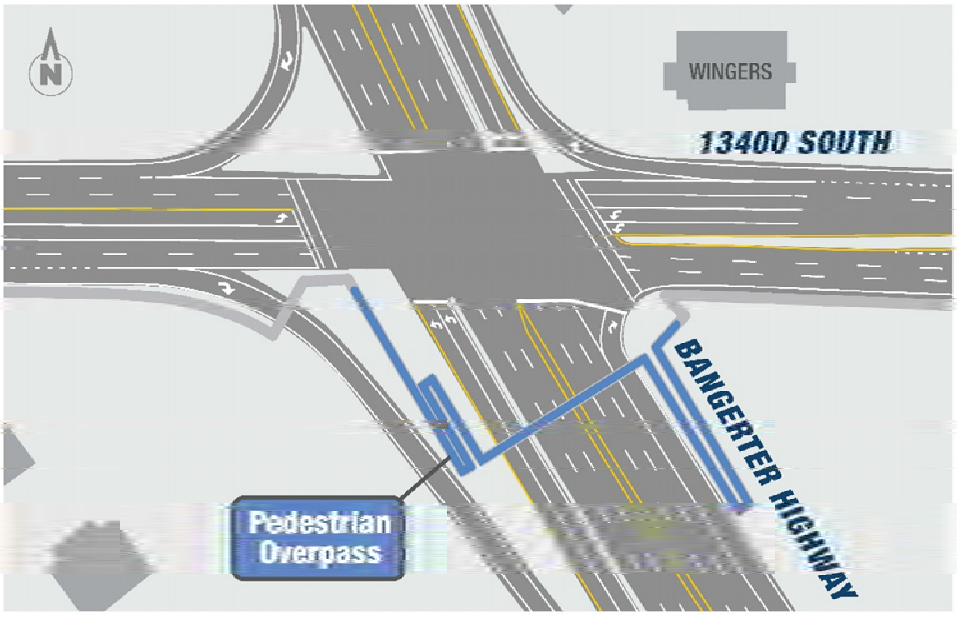


Schedule is process-driven and subject to change.

A UDOT PROJECT

PEDESTRIAN OVERPASS

BANGERTER



A UDOT PROJECT

POSSIBLE SOLUTIONS

BANGERTER

- Tight Diamond Interchange
- Single-Point Urban Interchange (SPUI)
- Over / Under
- No Action

A UDOT PROJECT

PUBLIC COMMUNICATION AND COMMENT CHANNELS

BANGERTER

30-day Comment Period ends July 28, 2021

Hotline: 888-766-ROAD (7623)

Email: bangerter@utah.gov

Website: udot.utah.gov/bangerter13400south

Mail: Bangerter Environmental c/o HDR
2825 East Cottonwood Pkwy., Suite 200
Salt Lake City, UT 84121

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Q&A

BANGERTER

Panelists


Brian Allen, P.E. | UDOT Project Manager (PM)


Tyler Allen | UDOT Environmental Manager


Marwan Farah, P.E. | UDOT Bangerter Program Project Manager


Amy Croft, Ph.D. | 13400 Environmental Lead


John Blumenkamp P.E. | 13400 Design Lead

Moderators


Melissa Phillips | 13400 Public Involvement


Brian Gray | 13400 Public Involvement

A UDOT PROJECT

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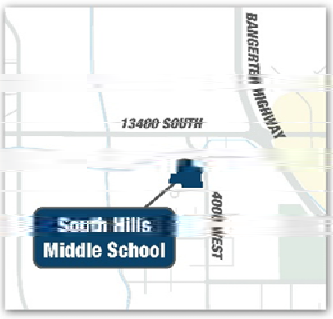
Mail: Bangerter Environmental c/o HDR
2825 East Cottonwood Pkwy., Suite 200
Salt Lake City, UT 84121

A UDOT PROJECT

IN-PERSON PUBLIC OPEN HOUSE

BANGERTER

The study team will also be hosting an in-person Public Open House.



When: Wednesday, July 14, 2021
6 - 7:30 p.m.

Where: South Hills Middle School
13508 S 4000 W
Riverton, UT 84065

The same information and materials will be available at both meetings. Input received during these meetings will help the team develop and refine the preferred design concept that will be available for comment later in the environmental process.

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C-3 In-person Public Meeting Information Boards 24x36

BANGERTER

WELCOME

Bangerter Environmental Open House

A UDOT PROJECT

MEETING PURPOSE

BANGERTER

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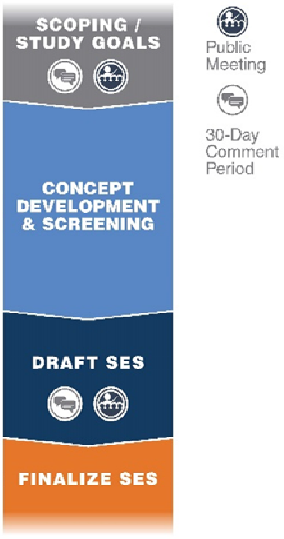
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A UDOT PROJECT

STATE ENVIRONMENTAL STUDY (SES)

BANGERTER



A UDOT PROJECT

STUDY GOALS

BANGERTER



Convert all remaining at-grade intersections on Bangerter Highway to grade-separated interchanges, or other freeway-like solutions.

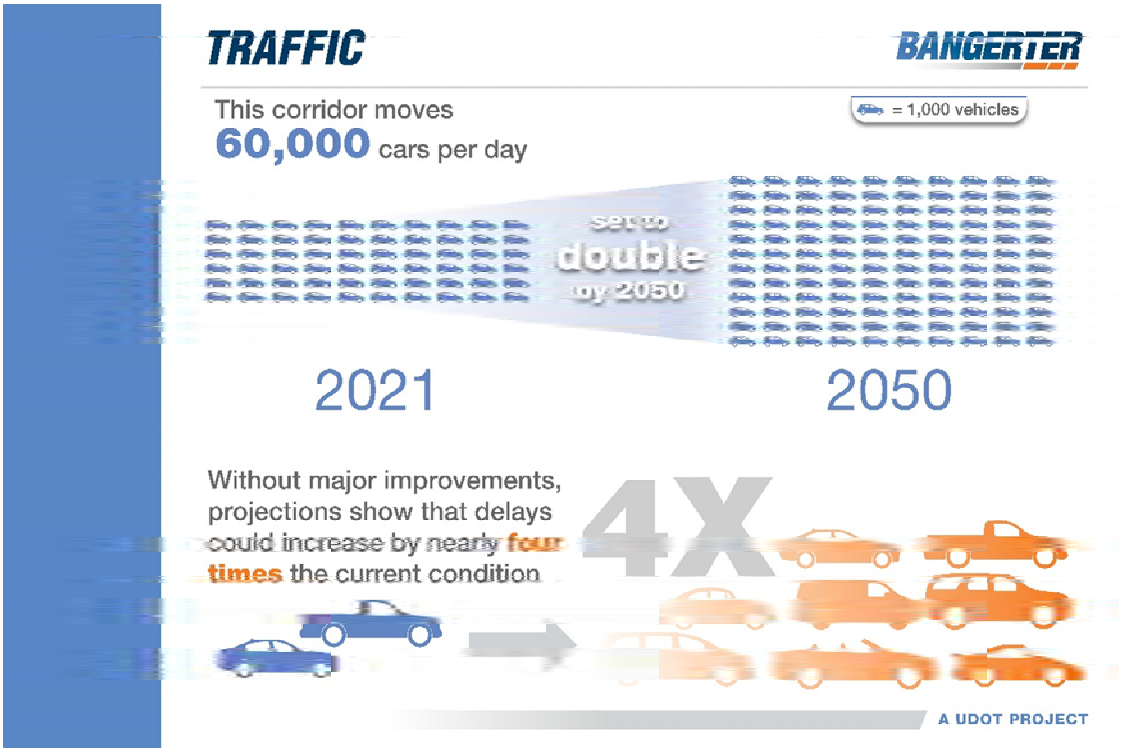


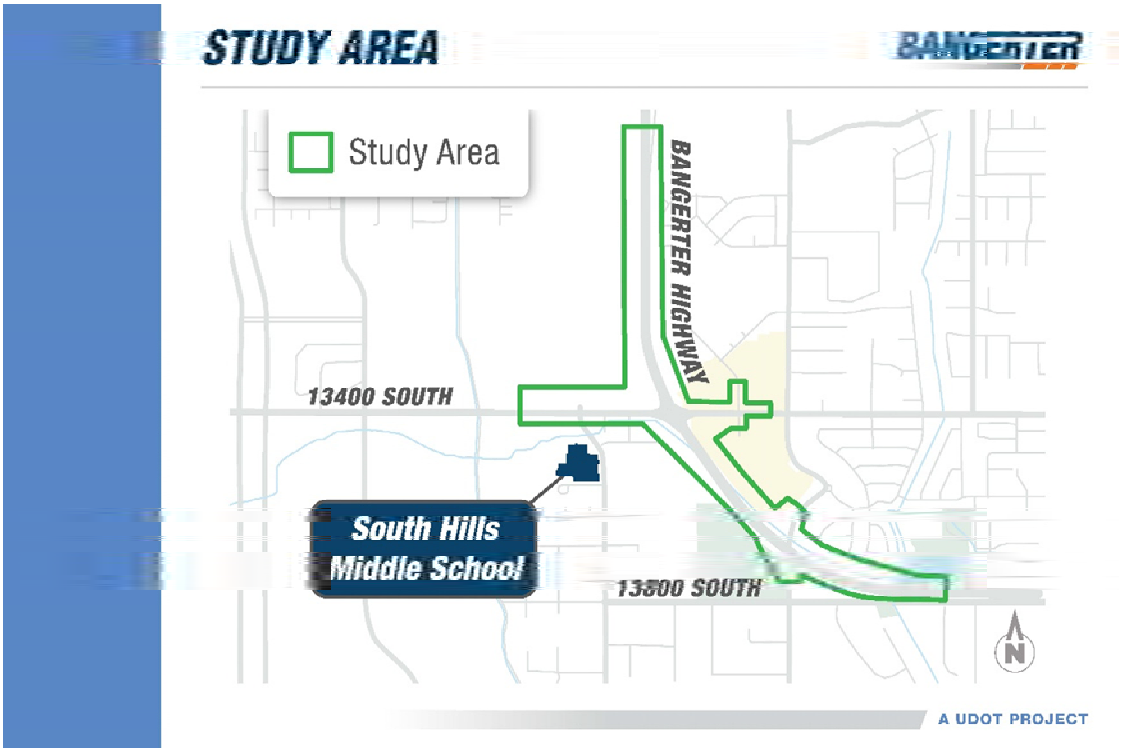
Enhance safety.



Improve travel times and increase mobility.

A UDOT PROJECT


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BANGERTER
This corridor moves
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by 2050
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A UDOT PROJECT

SCHEDULE

BANGERTER

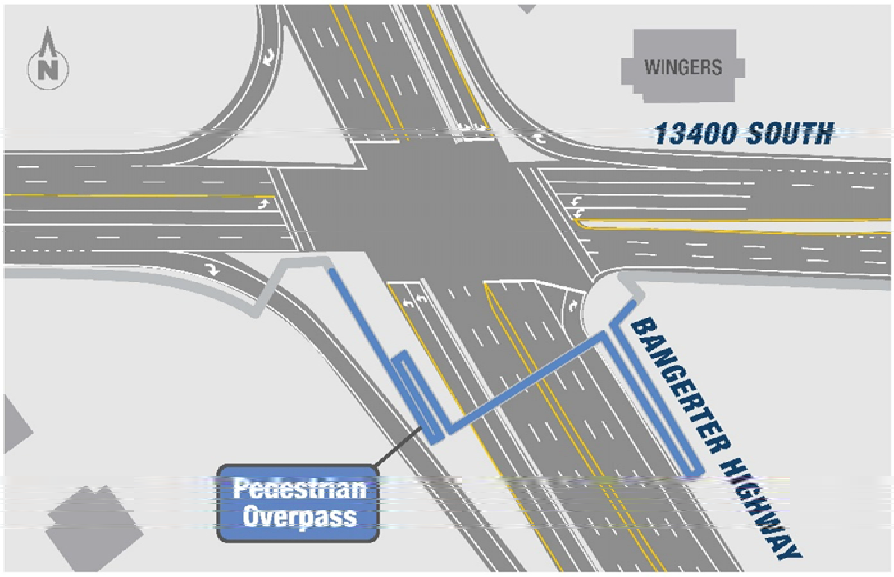


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A UDOT PROJECT

PEDESTRIAN OVERPASS

BANGERTER



A UDOT PROJECT


POSSIBLE SOLUTIONS
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Appendix D: Public Comments

Summary	
Submission methods Written meeting comments: 18 Email comments: 9 Mail comments: 1 **Total Comments: 28**	
Primary Concerns:	
Noise abatement Trash cleanup Pedestrian safety/bridge Traffic congestion General design concerns (preference for 10400-style interchange) Business relocation	Right-of-way questions 2700 West Utilities Canal Multi-modal transportation Herriman growth

Name	Comment
Robert May	7/14/2021 | Inbound | Meeting I feel it a great idea to put in the new intersection, it will cut down on traffic and pollution. My home backs up to Bangerter where there is no sound wall. I can hear the cars and trucks 24/7. I can't open any windows in the back of my home due to the sound, even with the window closed the sound is too much.
Sherry Russell	7/14/2021 | Inbound | Meeting If you are driving South on Bangerter and turn west on 13400 South the intersection at the next light 40th West is a hazard. If you live on or need to turn left on 40th West it is near impossible to negotiate because of the heavy traffic. As you consider this intersection, please do not overlook this problem. Herriman has grown way too fast and still is. The traffic Herriman has created is tremendous. We have people driving through our neighborhood trying to get to Herriman because all other roads are

	grid locked. Herriman needs to plan ahead and pay for access to their community without ruining the rest of the community and valley.
Heather Mickelson	7/13/2021 | Inbound | Email Hello, What is considered in this environmental study from UDOT? I am not sure what sort of environmental factors will be considered. It is common to see dead wildlife on Bangerter, especially on the south end of the valley. Does the environmental study consider a mechanism to allow wildlife to cross Bangerter? For example, there is an overpass with fencing to control wildlife crossing on 1-80 near Park City. Second - Bangerter is noisy. Will some sort of noise suppression be installed during construction? I understand that there will be a lot of noise (and dust) during construction. I am asking about road noise following construction. Third, can walkability/bikeability be improved with this intersection? Currently, to cross Bangerter at 13400 south, there is a pedestrian bridge to cross Bangerter and then there is a crosswalk to cross part of 13400 south. This small crosswalk is dangerous as the traffic moving from 13400 south to Bangerter flows continuously. Is it possible to cross without the crosswalk? Is it possible to have a bike safe area to cross Bangerter? Fourth, can pedestrian crossing on 13400 south be improved? I expect that commercial development is expected on the north side of 13400 south. It is currently difficult to get from the southside to the northside of 13400 south. Heather
Emilee Andrus	7/13/2021 | Inbound | Email Good afternoon- I am concerned about the amount of traffic congestion at 13400 S and Bangerter and nearby Riverton shopping areas. With the amount of growth in nearby Herriman, sitting at lights has significantly increased, and I am seeing lots of frustrated drivers, and aggressive driving to make it through lights. How can the public assist with getting this project moved up?

	Sincerely Concerned, Emilee Andrus emailemilee@hotmail.com
Ashley Magee	7/13/2021 | Inbound | Email Hello, As we approach a discussion to work on the Bangerter intersection at 134th, will you please take a drive on that road during rush hour, heading west to east. Please consider providing a simulation on what will happen with construction going on at that point without opening roads through Bluffdale, such as Rosecrest and 144th. Please understand that there is no west to east access or Vice verse as people try to travel home from work, besides 134th and Porter Rockwell. Is there any other place in SL County that does no have access for that many blocks, for two cities? My question is, consider opening roads in Bluffdale to alleviate the extreme traffic that this will create. It is needed regardless. If the light goes down in that area, it can be hours to get home, if you live in Herriman. You are proposing that access to Herriman will be only 126th or Porter Rockwell? Open roads in Bluffdale, just as every other city has opened their roads to their neighbors. Thank you, Ashley Magee
Heather Mickelson	7/13/2021 | Inbound | Email Hello, As requested, here are comments on the interchange at 13400 south and Bangerter. Thank you for considering them during the design of the new interchange. First - As it is common to see dead wildlife on Bangerter or to try to avoid hitting wildlife on Bangerter, does the design consider a mechanism that directs wildlife to cross Bangerter safely? For example, there is an overpass with fencing to control wildlife crossing on I-80 in Parleys Canyon. This is an extreme example and I am not recommending that an overpass is constructed specifically for wildlife. Second - Bangerter is noisy. Will some sort of noise suppression be

	installed during construction? I understand that there will be a lot of noise (and dust) during construction. I am asking about road noise following construction. Third, can walkability/bikeability be improved with this intersection? Currently, to cross Bangerter at 13400 south, there is a pedestrian bridge to cross part of Bangerter and then there is a small crosswalk to cross the right hand turn lane of 13400 south. This small crosswalk is dangerous as the traffic moving from 13400 south to Bangerter flows continuously. My husband has been nearly hit in this crosswalk and children should never use this crosswalk. Can a pedestrian bridge be added to cross Bangerter that starts and ends in a safe location? Also, is it possible to have a safe biking lane or area to cross Bangerter? Fourth, can pedestrian crossing on 13400 south be improved? I expect that commercial development is expected on the north side of 13400 south. It is currently impossible to get from the southside to the northside of 13400 south. Fifth, I really like the 11400 South interchange compared to the interchanges that go over the road they are crossing. I feel safer walking/biking across bangerter on 11400 south than the one on 5400 south. Heather
Charlie Wallwork	7/14/2021 | Inbound | Meeting As a business owner that will definitely be impacted: During and after construction we would just like to have it just like the 11400 South interchange and definitely not like the 90th South interchange or the 5400 South interchange. Make an under over not a huge overpass.
Marcus Johnson	7/14/2021 | Inbound | Meeting Would really like to make sure out home/neighborhood is part of any sound study. It currently is so noise that it wakes us up.
Amy Rose	7/14/2021 | Inbound | Meeting We live in Palisade Acres just adjacent to Bangerter as it curves, south of 13400 South. Headlights and road noise are a significant negative impact in the enjoyment of all homes in our neighborhood. We are wondering if our home will be in the noise study area. The previous sound wall for homes a similar distance from Bangerter was installed years ago when there was even less noise. We support Bangerter

	improvements and hope UDOT will recognize the significant impact of noise on us and my neighbors. Please let us know if my home will be included in the noise study area. If no0, please help us know how best to request extension of the noise study area or otherwise have our concerns addressed.
Tim Maynes	7/14/2021 | Inbound | Meeting Currently, traffic transitioning from westbound Bangerter to westbound 13400 South cues up as far back as the Redwood Road overpass. This condition existed prior to the current construction on 12600 South. It would be my suggestion to have a free flow of traffic in this area either via a flyover ramp or something producing the same result. Please take into consideration the overpass at 3600 West when determining grades so as to avoid the roller coaster scenario that has already been created between 11400 S and 11800 South and between 9000 South, the Traxx overpass and 7800 South.
Patrick White	7/14/2021 | Inbound | Meeting I am the property owner of Innovation Square, the Shopping Center on the Southwest Corner, Tunex to Holiday Oil. Multiple Structures. I also own the adjoining roads, the roads were built to accommodate the center. High pressure gas lines, High Voltage Power Lines and Many Obstacles on the SouthWest Corner. Kern River Gas Line is very sensitive. Canal cannot be disrupted.
Di He	7/14/2021 | Inbound | Meeting Please build a sound wall between old farm park and Walmart. The road noise has become a major problem for the residents by the east of Walmart. A sound wall is needed in this area.
Cliff Strachan	7/14/2021 | Inbound | Meeting I primarily drive N to S on Bangerter Highway. Somehow the NB left turn onto 13400 South needs to accommodate a lot more traffic. During the evening rush it impedes the flow nearly to 2700 West. Getting In and Out of Home Depot is brutal. Can we get an on-ramp that is NB from the road?

	Putting the Bangerter under 13400 South as done at 11400 South and 10400 South maintains flow and community.
David Russell	7/14/2021 | Inbound | Meeting (Map of 13400 drawn) It is very difficult to negotiate coming south off Bangerter Highway to westbound 13400 South and then to fight traffic to go southbound on to 4050 West - Please Fix This! Also make the City of Herriman pay/plan for ways in and out of their city. Unbridled/Unplanned growth has consequences even if it does benefit some of the wealthiest families in the state!
Camille He	7/14/2021 | Inbound | Meeting We look forward to the study and implementation to reducing noise control to homeowners who live North, South, and East of the Bangerter Curve. We live approximately 13500 South and 3300 West and hear the noise likely more than other neighborhoods. Would like to see this consideration with the 13400 project instead of waiting for a 2700 West approval. We vote UNDER for the new 13400 South Construction. Thanks!!
FaNae Oaksen	7/14/2021 | Inbound | Meeting Please be very aware of pedestrian traffic there are needs to be safe crossing. Removing as few businesses as possible as well.
Natalia Brown	7/14/2021 | Inbound | Meeting Please include the area east of Bangerter/13400 South in your alternatives. Right now people can wait several signal rides to get through. The signal for Walmart in particular is very bad in the PM peak period.
Jason Hutchison	7/14/2021 | Inbound | Meeting I feel that UDOT has fallen short on their responsibility to provide adequate noise reduction via a sound wall in our community. Bangerter traffic has increased exponentially over the last few years and will only increase going forward. We cannot even talk to our neighbors over the fence. Property values as well as quality of life have been impacted by this issue.
Jennifer Hannon	7/14/2021 | Inbound | Meeting 1. Concern of noise/possibility of a better sound wall/barrier

	2. We are concerned that an on-ramp/construction would cut into our yard 3. Concerned a new sound wall would kill our trees we have planted along the Bangerter Wall
Steven Bullard	7/14/2021 | Inbound | Meeting Us and our neighbors are very interested if a sound wall is in the plans for the neighborhood of Rose Creek Crossing Community. Please take into consideration our thoughts and concern for our neighborhood. Thank you
Tony Skanchy	7/14/2021 | Inbound | Meeting Our dental office is location on 4013 W 13400 S Hoping that these changes will affect us as little as possible. If any road changes need to happen on 13400 South, which hopefully they shouldn't , we are hoping expansion would occur on the North side of 13400 South so businesses don't need to be relocated which would greatly impact us. Thank you!!
Charlie Wallwork	7/14/2021 | Inbound | Meeting As a business owner that will definitely be impacted: During and after construction we would just like to have it just like the 11400 South Interchange and definitely not like 90th South interchange or 5400 South interchange. Make it an under over not a huge overpass.
B Nichols	7/14/2021 | Inbound | Email I live right next to bangerter, close to 134 s. It can get so loud, I am really concerned with bangerter turning more into freeway style and the continual increase in noise level. Please construct a sound wall to help us have level of peace. Thanks
Michelle Tacke	7/15/2021 | Inbound | Email Need sound walls after 2700 west and before 13400 south. We live in the neighborhood in this area (east of Bangerter) and the sound from Bangerter is extremely loud and getting worse. Need soundwalls!
Bryan Dipo	7/15/2021 | Inbound | Email I sat through the presentation and appreciate your time in discussing the ideas with the residents of Riverton. I live near South Hills Middle

	school and we do use the pedestrian bridge to cross over to Walmart and the area to the east of our house. In my opinion, any solution needs to include any and all safety provisions for children using the overhead bridge to walk to school. I would assume that an "under" 134th south option for Bangerter Highway would be best for this (similar to 114th south) but most residents will have two main concerns….1. how will this impact my children when crossing Bangerter and 2. What noise reduction can be done to limit the noise effects of Bangerter highway for the homes near that highway. Thank You, Bryan Dipo
Kyle Coles	7/16/2021 | Inbound | Email Thank you for hosting the public meeting on the Bangerter and 13400 S project. I wanted to provide my input. I think UDOT did a fantastic job on the project at Bangerter and 11400 S. I really hope that the same design and overall project scope will be mimicked. I believe having Bangerter flow under 13400 will greatly improve traffic flow and safety. Please build this bridge project to accommodate even larger than your projections. This areas of the valley is growing rapidly. Spend the extra money and time to add enough lanes, ramps that we are not revisiting this in 10 years. Thanks, Kyle
Kirk Woolley	7/19/2021 | Inbound | Email To Whom it May Concern: Last week I attended an open house for the proposed improvements to 13400 South and Bangerter Highway. In my discussions with personnel from UDOT, I pointed out that the current configuration of traffic at the intersections of 13400 South and 2700 West and Bangerter Highway currently serve as metering lights for East bound traffic. Once the aforementioned intersections are improved to freeway on-off ramps and under-over passes, traffic will flow Southbound and Eastbound unimpeded to the Northbound on ramp at Bangerter and I-15. Presently morning "rush hour" traffic at that location is very congested.

	Without improvements to that Northbound I-15 ramp, morning traffic will only become a greater safety hazard backed up well beyond the turn lanes and onto Eastbound Bangerter Highway traffic. I hope you are giving consideration to some type of improvement to Bangerter and I-15 to help with this future issue. Just a concerned citizen. Thank you.
Trudie Fullmer	7/28/2021 | Inbound | Mail (Received by postage) I have every confidence that no matter which over/underpass you choose it will serve the purpose of moving traffic efficiently - HOWEVER - I am ready to take my broom and sweep the streets - I AM EMBARASSED to have friends drive out west to visit me and have to drive through trash that's been there for over two years!! And week removal...old signs attached to walk-over passes that look like they lead to the state prison - Do we not pay enough taxes to clean up our streets and make our area look more welcoming? When the UDOT Bangerter Developers talk to our city - can cleanliness and curb appeal be a part of the project PLEASE? Thank you



Appendix C: Public Involvement

Bangerter Highway at 13400 South
Public Meeting Report

BANGERTER HIGHWAY AT 13400 SOUTH

PUBLIC MEETING REPORT

Project Number: S-0154(92)0

PIN: 18808

Prepared For: Utah Department of Transportation

Prepared By: Horrocks Engineers & HDR

Date: February 28, 2022

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Study Overview

The Utah Department of Transportation (UDOT) has initiated State Environmental Studies (SESs) for the following intersections along Bangerter Highway:

- 2700 West
- 13400 South
- 9800 South
- 4700 South
- 4100 South
- 3500 South to S.R. 201
- California Avenue

Bangerter Highway is a major north-south corridor in the state of Utah, and with continued growth in the area, the amount of traffic on Bangerter Highway is expected to increase. This projected increase in traffic will also increase delays on Bangerter Highway by up to four times longer than the current conditions. UDOT is proposing to replace at-grade, signalized intersections along the corridor with grade-separated interchanges, which will allow one street to pass over the other. This separation will move Bangerter Highway and cross-street traffic more efficiently and will eliminate points of conflict along this busy highway.

The purpose of this study is to identify the best solution to address the needs along Bangerter Highway, evaluate the impacts of the proposed improvements to the natural and built environments, and provide opportunities for public input.

The following report is a summary of the preparation and execution of the Business and Neighborhood Meeting (in-person only) and the Public Hearing (both in-person and online options) regarding the Bangerter Highway and 13400 South intersection.

Meeting Summaries

BUSINESS AND NEIGHBORHOOD MEETING

MEETING OVERVIEW

An in-person Business and Neighborhood Meeting was held to review the proposed improvements, communicate potential property impacts with property owners and businesses, and provide property owners and businesses with information related to the right-of-way process and anticipated project schedule.

When/Where

Business and Neighborhood Meeting

When: Thursday, Dec. 9, 2022
6 to 7:30 p.m.

Where: South Hills Middle School
13508 South 9800 4000 West
Riverton, UT 84065

ADVERTISEMENTS

The invitations for the Business and Neighborhood Meeting were limited to those property owners with direct impacts and those who would become the "new front row," the homes closest to Bangerter Highway, when future construction is complete. Outreach efforts to these properties included:

- **Nov. 25, 2022** – Door hangers were distributed to residential properties identified as potentially impacted by the project.
- **Nov. 25, 2022** – Business flyers were distributed to commercial properties identified as potentially impacted by the project.
- **Nov. 25, 2022** – Property owner information was gathered from businesses.
- **Nov. 25 – Dec. 2, 2022** – Calls and emails were sent to commercial property owners.
- **Nov. 30, 2022** – The project website was updated with the meeting information.

*Copies of the Business and Neighborhood Meeting outreach advertisements are available in **Appendix A**.*

ATTENDANCE

- 8 stakeholders signed in for and attended the Business and Neighborhood Meeting held on Thursday, Dec. 9.

*A list of Neighborhood Meeting attendees is available in **Appendix B**.*

INFORMATION PRESENTED

The study team began the Business and Neighborhood Meeting with a presentation by Brian Allen, the UDOT Project Manager. This presentation highlighted information including the study goals, alternative selection process, and more. The presentation slides were also printed onto boards, which were positioned around the room for accessibility.

Additionally, scroll plot maps were provided for viewing at the meeting. Three scroll plots that included preliminary design and potential impact information were displayed showing the west shift alternative for the over, under, and hybrid vertical alignment options.

*A copy of the information presented at the Business and Neighborhood Meeting is available in **Appendix C**.*

PUBLIC HEARING

MEETING OVERVIEW

A Public Hearing was held, with both an in-person and online engagement opportunity, to review the proposed improvements and gather feedback.

When/Where

In-Person Open House

When: Wednesday, Jan. 19, 2022
6 to 7:30 p.m.

Where: South Hills Middle School
13508 South 9800 4000 West
Riverton, UT 84065

Online Presentation and Q&A

When: Thursday, Jan. 20, 2022
6 to 7 p.m.

Where: Zoom webinar – A link to join the online meeting and registration instructions were available on the study website: udot.utah.gov/bangerter13400south

ADVERTISEMENTS

The study team (consisting of UDOT staff and consultant firms) developed and executed a comprehensive outreach plan to invite adjacent property owners, residents, and the general public to attend one of the Public Hearing opportunities. The plan included:

- **Dec. 27, 2021** – 2,040 postcards were sent to addresses near the study area.
- **Jan. 3, 2022** – Public Hearing information was added to the project website.
- **Jan. 13, 2022, at 9:52 a.m.** –An email notification was sent to the Bangerter Highway at 13400 South stakeholder list.

- **Jan. 17 - Jan. 18, 2022** – Social media notifications advertising the Public Hearing were posted on UDOT's and Riverton City's social media channels.
- **Jan. 18, 2022** – A media notice with details about the Public Hearings for all Bangerter Highway intersections undergoing SESs were sent to major media outlets.
- **Jan. 19, 2022** – A press release was sent out with information about the three proposed Bangerter Highway interchanges.
- A legal notice was published in the major newspaper publications as required by the UDOT Environmental Manual of Instruction and Utah Administrative Code R930-2. The legal notice was published **Jan. 5, 2022**, and **Jan. 12, 2022**, in the print and digital versions of the Salt Lake Tribune; **Dec. 31, 2021**, and **Jan. 7, 2022**, in the print version of the Deseret News; and Jan. 5, 2022, and Jan. 12, 2022, in the digital version of the Deseret News.

*Copies of the Public Hearing advertisements are available in **Appendix A**.*

ATTENDANCE

- 37 stakeholders signed in for the in-person Public Hearing on Wednesday, Jan. 14, 2022
- 31 stakeholders were logged for the online Public Hearing on Thursday, Jan. 25, 2022

*A list of attendees for the online meeting and scanned copies of the sign-in sheets from the in-person meeting are available in **Appendix B**.*

INFORMATION PRESENTED

The study team began the Public Meeting with a presentation by Brian Allen, the UDOT Project Manager. This presentation highlighted information including the study goals, alternative selection process, and more. The presentation slides were also printed onto boards, which were positioned around the room for accessibility. The same information was presented at both Public Hearing opportunities.

After the presentation, in-person attendees had the opportunity to look at scroll plot maps showing preliminary design and impact information for the west shift alternative with the over, under, and hybrid vertical alignment options and ask questions to members of the project team. A physical copy of the Draft SES was available for attendees to review. Online attendees had the opportunity to participate in a live Q&A session with members of the project team and UDOT's Right of Way team.

*Materials presented at these meetings are available in **Appendix C**.*

INFORMATION AVAILABLE ON THE STUDY WEBSITE

The study team utilized a project website throughout the environmental process to provide a centralized place for the public to access study information. In preparation for the Public Hearing, the website was updated with meeting details and registration links for the online option.

Additionally, a copy of the Draft SES was published on the website at the start of the formal comment period (the formal comment period was held from Jan. 17, 2022, through Feb. 15, 2022). Copies of the

scroll plot maps for over, under and hybrid vertical alignment options, were featured as well, along with copies of the Public Hearing presentation slides. After the online Public Hearing, a recording of the meeting was published to allow anyone who could not attend the opportunity to hear the information presented.

PUBLIC COMMENTS

A 30-day formal comment period was held from Jan. 17, 2022, through Feb. 15, 2022. A comment form was available at the in-person Public Hearing and on the study website for the general public's use. A court reporter was also available at the in-person Public Hearing to record verbal comments.

A total of 35 comments were received (9 email comments, 20 website comments, 3 verbal comments at the in-person Public Hearing, and 3 written comments from the in-person Public Hearing).

Common themes from the public comments included:

- Noise and noise analysis (10)
- Design concerns (15)
    - Design preference (over, under, hybrid)
    - On- and off-ramp lanes
    - Growth predictions
    - Traffic modeling
- Construction concerns – closures, delays, detours (4)
- Utility coordination (1)
- General support for the project (6)

The verbatim public comments and associated responses are provided in Error! Reference source not found..

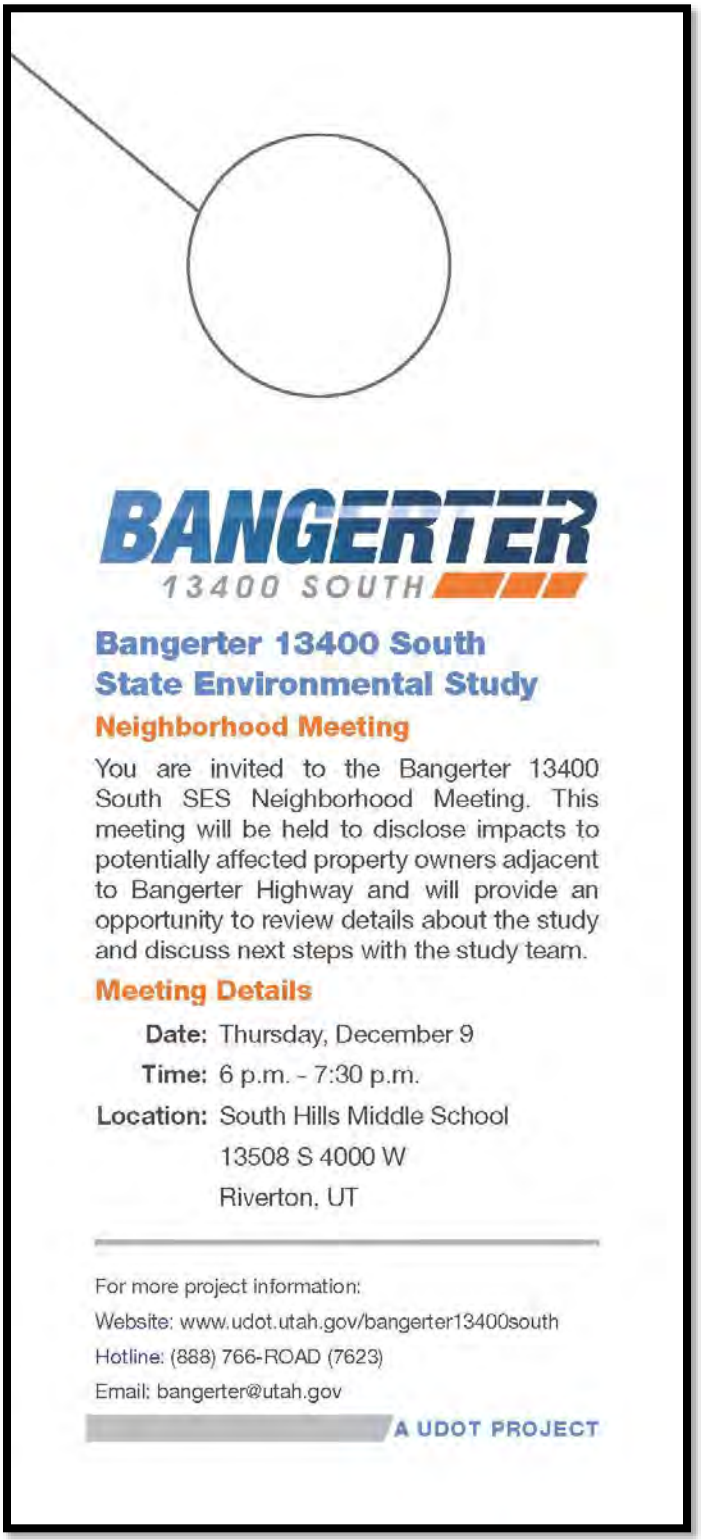
Appendix A Advertisements

Business and Residential Outreach

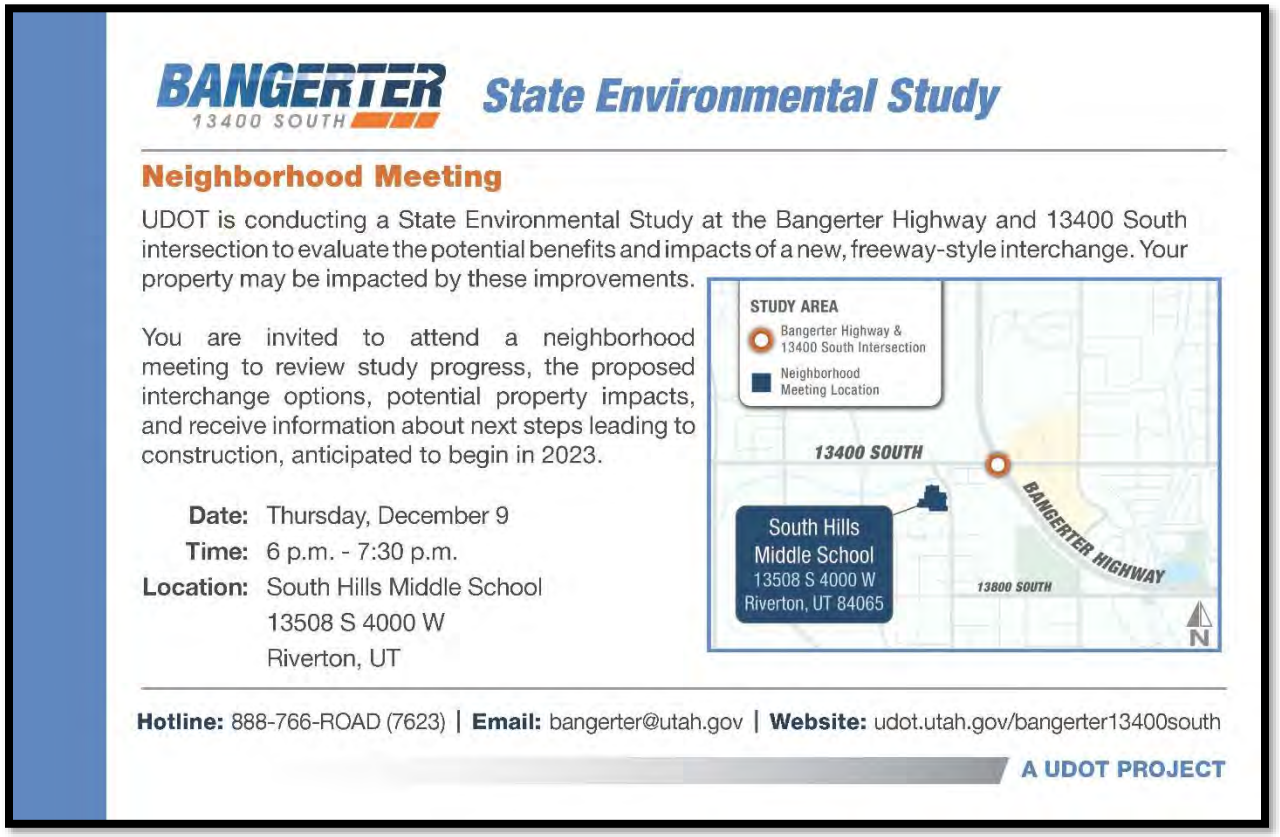
Parcel #	Address	Owner	Contact	Phone	Email
1378	4158 W 13400 S	South Mountain Advancement, LLC CT Corporation System	Mesha Serrano		[redacted]
157	3809 W 12600 S	IHC Health Services	Todd Neubert	[redacted]	[redacted]
155	4152 W 13400 S	Corp of PB of Ch of JC of LDS (LDS Church)	Tom Checketts Dan McCay Matt Stapley	[redacted]	[redacted]
					[redacted]
					[redacted]
156	12922 S Sandy Slope Circle	[redacted]			
154	12926 S Sandy Slope Circle	[redacted]			
152	12954 S Sand Creek Drive	[redacted]			
151	12968 S Sand Creek Drive	[redacted]			
144	12924 S 3600 W	Corp of PB of Ch of JC of LDS (LDS Church)	Guy Crosley	[redacted]	[redacted]
143	3986 W 13400 S	CORPORATION OF THE PRESIDING BISHOP OF T (LDS Church)	Tom Checketts Dan McCay Matt Stapley	[redacted]	[redacted]
142	3740 W MARKET CENTER DR	CORPORATION OF THE PRESIDING BISHOP OF T (LDS Church)	Guy Crosley	[redacted]	[redacted]
135	3816 W 13400 S	KNIGHT FAMILY REAL ESTATE, LLC	Stewart Knight	[redacted]	[redacted]
140	3852 W MARKET CENTER DR	HD DEVELOPMENT OF MARYLAND INC			
136	13348 S MARKET CENTER DR	SOUTH BANGERTER HC LLC	Zach Anderson	[redacted]	[redacted]
137	3982 W 13400 S	SUBURBAN LAND RESERVE INC/LDS	Tom Checketts Dan McCay Matt Stapley	[redacted]	[redacted]
					[redacted]
					[redacted]
115	13589 S 4000 W	CORP OF PB OF CH JC OF LDS	Tom Checketts Dan McCay Matt Stapley	801-321-8757	[redacted]
					[redacted]
					[redacted]

119	3897 W 13400 S	GARY AND PATRICIA WHITE MANAGEMENT COMPA	Patrick K White	[redacted]	[redacted]
123	3926 W INNOVATION DR	GARY AND PATRICIA WHITE MANAGEMENT COMPA	Patrick K White	[redacted]	[redacted]
123B	13460 S MILLENNIAL LN	GARY AND PATRICIA WHITE MANAGEMENT COMPA	Patrick K White	[redacted]	[redacted]
117	3854 W INNOVATION DR	CORPORATION OF THE PRESIDING BISHOP OF T	Matt Stapley	[redacted]	[redacted]
121	3901 W INNOVATION DR	WEST INNOVATION, LLC	Scott E Carl		[redacted]
120	3843 W 13400 S	ASH RIVERTON, LLC - IHOP	Scott R Heninger	[redacted]	[redacted]
116	3823 W 13400 S	WAL-MART STORES INC			[redacted]
114	13680 S HAMILTON VIEW RD	RIVERTON CITY			
111	3620 W 13800 S	RIVERTON CITY			
129B	4131 W 13400 S	Cleon and Dixie Anderson		[redacted]	[redacted]

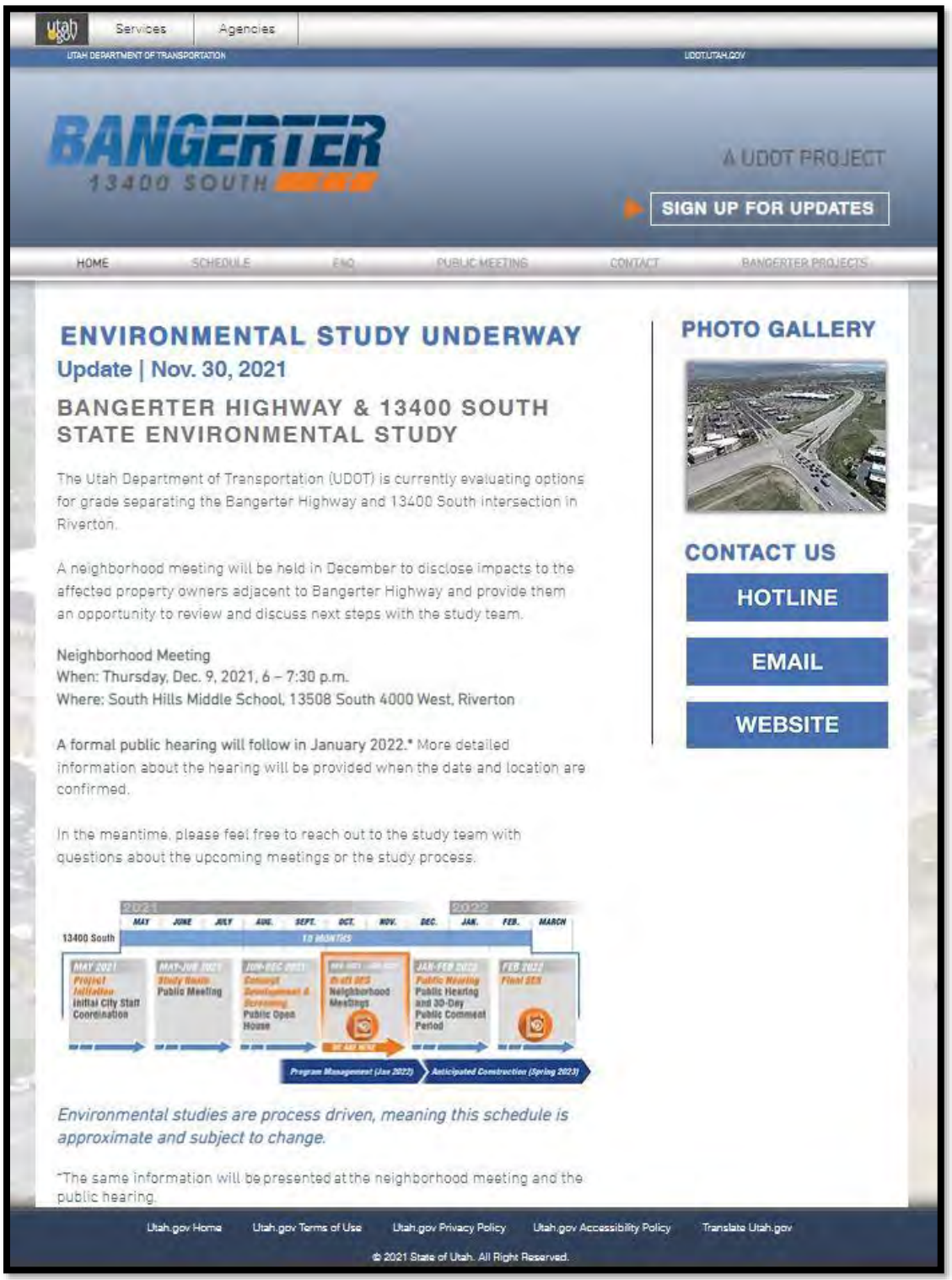
Neighborhood Meeting Door Hanger



Neighborhood Meeting Business Flyer



Neighborhood Meeting Project Website Post



Services Agencies

UTAH DEPARTMENT OF TRANSPORTATION udot.utah.gov

BANGERTER 13400 SOUTH

A UDOT PROJECT

SIGN UP FOR UPDATES

HOME SCHEDULE FAQ PUBLIC MEETING CONTACT BANGERTER PROJECTS

ENVIRONMENTAL STUDY UNDERWAY

Update | Nov. 30, 2021

BANGERTER HIGHWAY & 13400 SOUTH STATE ENVIRONMENTAL STUDY

The Utah Department of Transportation (UDOT) is currently evaluating options for grade separating the Bangerter Highway and 13400 South intersection in Riverton.

A neighborhood meeting will be held in December to disclose impacts to the affected property owners adjacent to Bangerter Highway and provide them an opportunity to review and discuss next steps with the study team.

Neighborhood Meeting
When: Thursday, Dec. 9, 2021, 6 – 7:30 p.m.
Where: South Hills Middle School, 13508 South 4000 West, Riverton

A formal public hearing will follow in January 2022.* More detailed information about the hearing will be provided when the date and location are confirmed.

In the meantime, please feel free to reach out to the study team with questions about the upcoming meetings or the study process.

Environmental studies are process driven, meaning this schedule is approximate and subject to change.

*The same information will be presented at the neighborhood meeting and the public hearing.

PHOTO GALLERY

CONTACT US

HOTLINE

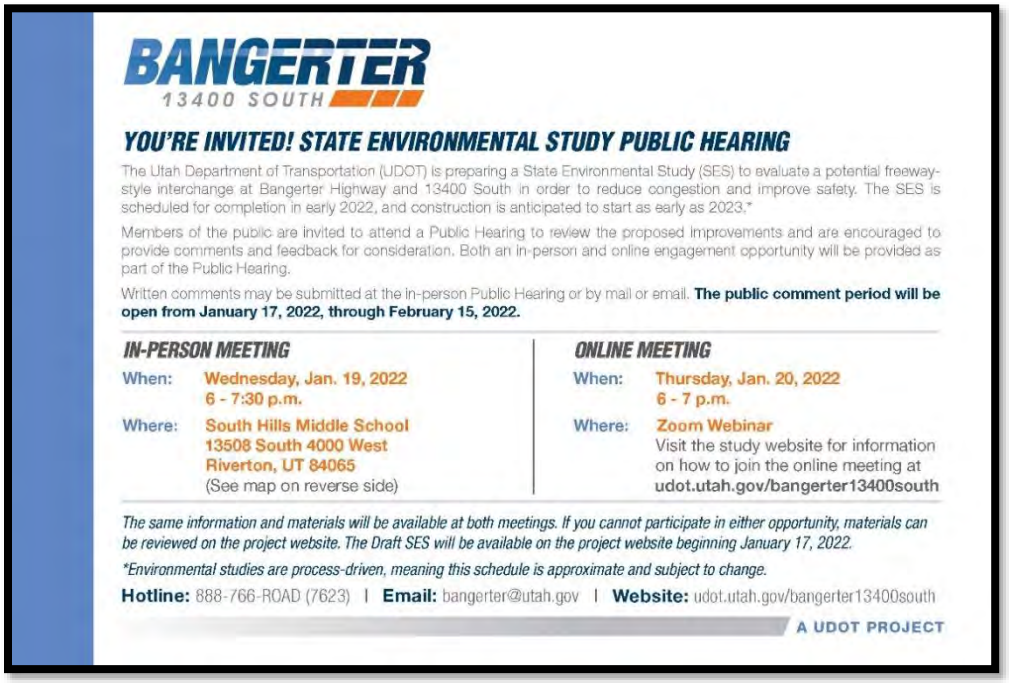
EMAIL

WEBSITE

Utah.gov Home Utah.gov Terms of Use Utah.gov Privacy Policy Utah.gov Accessibility Policy Translate Utah.gov

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Public Hearing Postcard Invitation



BANGERTER
13400 SOUTH

YOU'RE INVITED! STATE ENVIRONMENTAL STUDY PUBLIC HEARING

The Utah Department of Transportation (UDOT) is preparing a State Environmental Study (SES) to evaluate a potential freeway-style interchange at Bangerter Highway and 13400 South in order to reduce congestion and improve safety. The SES is scheduled for completion in early 2022, and construction is anticipated to start as early as 2023.*

Members of the public are invited to attend a Public Hearing to review the proposed improvements and are encouraged to provide comments and feedback for consideration. Both an in-person and online engagement opportunity will be provided as part of the Public Hearing.

Written comments may be submitted at the in-person Public Hearing or by mail or email. **The public comment period will be open from January 17, 2022, through February 15, 2022.**

IN-PERSON MEETING

When: Wednesday, Jan. 19, 2022
6 - 7:30 p.m.

Where: South Hills Middle School
13508 South 4000 West
Riverton, UT 84065
(See map on reverse side)

ONLINE MEETING

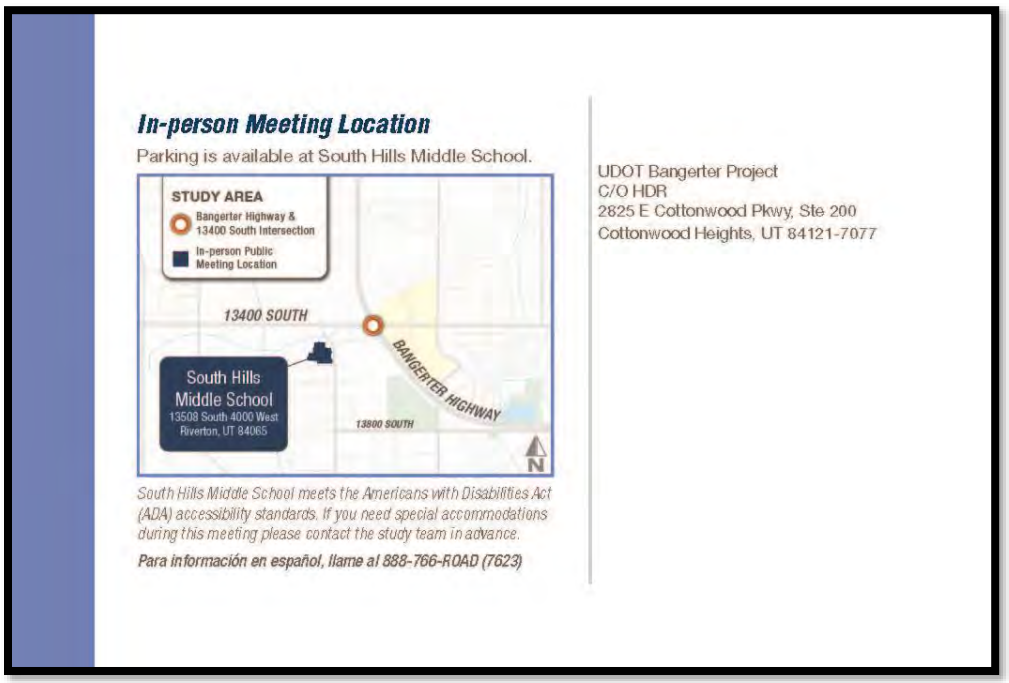
When: Thursday, Jan. 20, 2022
6 - 7 p.m.

Where: Zoom Webinar
Visit the study website for information on how to join the online meeting at
udot.utah.gov/bangerter13400south

The same information and materials will be available at both meetings. If you cannot participate in either opportunity, materials can be reviewed on the project website. The Draft SES will be available on the project website beginning January 17, 2022.

**Hotline:* 888-766-ROAD (7623) | **Email:* bangerter@utah.gov | **Website:* udot.utah.gov/bangerter13400south

A UDOT PROJECT



In-person Meeting Location

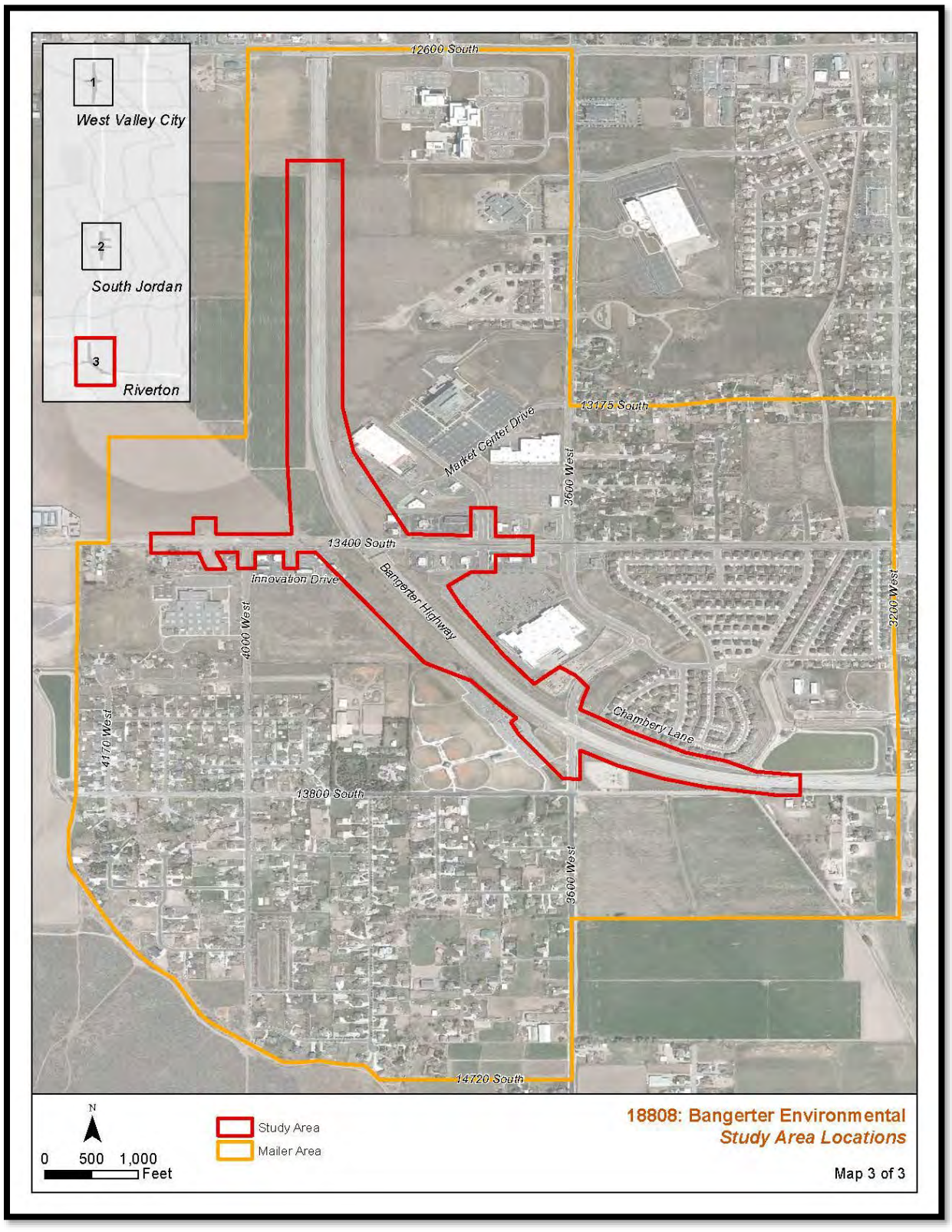
Parking is available at South Hills Middle School.

South Hills Middle School meets the Americans with Disabilities Act (ADA) accessibility standards. If you need special accommodations during this meeting please contact the study team in advance.

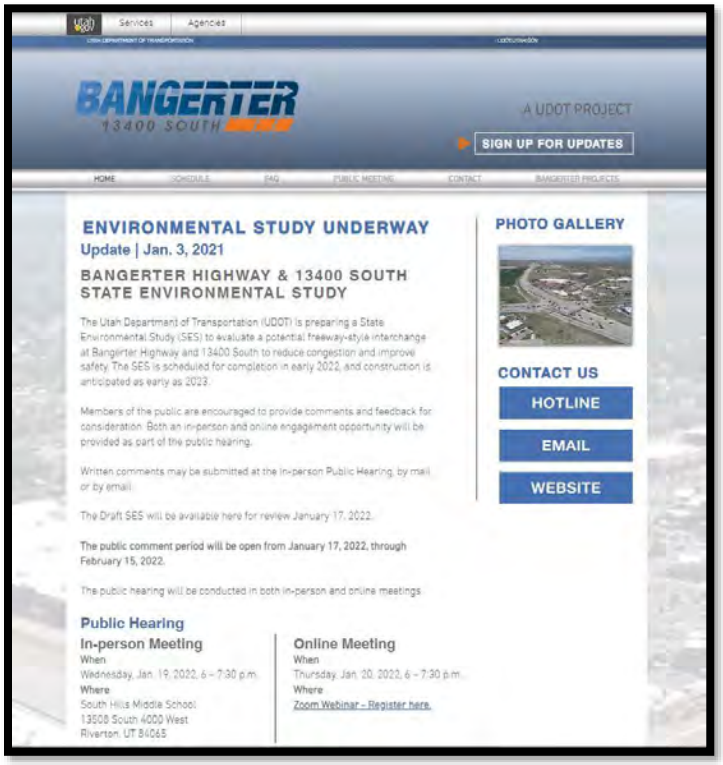
Para información en español, llame al 888-766-ROAD (7623)

UDOT Bangerter Project
C/O HDR
2825 E Cottonwood Pkwy, Ste 200
Cottonwood Heights, UT 84121-7077

Public Hearing Mailer Area



Public Hearing Project Website Post





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CAPTION
NOTICE OF PUBLIC HEARING On Proposed Improvements for the Bangerter Highway (S.R. 154) and 13400 South Intersection in Salt Lake County, UT; UDOT Project No.

TOTAL COST
$325.04

NOTICE OF PUBLIC HEARING

On Proposed Improvements for the
Bangerter Highway (S.R. 154) and 13400 South Intersection
in Salt Lake County, UT;
UDOT Project No. S-0154(92)0

As part of the State Environmental Study process, the Utah Department of Transportation (UDOT) advises all interested persons or groups that a Public Hearing will be held to present the proposed improvements at the Bangerter Highway and 13400 South intersection in Salt Lake County, UT. The proposed project includes constructing a grade-separated Single Point Urban Interchange at the intersection of Bangerter Highway and 13400 South. Both an in-person and online engagement opportunity will be provided as part of the Public Hearing.

In-person
When: Wednesday, Jan. 19, 2022, from 6 – 7:30 p.m.
Where: South Hills Middle School,
13508 South 4000 West, Riverton, UT 84065

Online
When: Thursday, Jan. 20, 2022, from 6 – 7 p.m.
Where: Visit udot.utah.gov/bangerter13400south for instructions on how to join the online meeting.

Members of the public are invited to attend the Public Hearing and are encouraged to provide comments and feedback for consideration. Information to be presented at the meetings will include the Draft State Environmental Study which identifies a Proposed Action, the process used to identify the Proposed Action, environmental resources considered and appropriate mitigation. The team will also present the project schedule and will be available to answer questions.

The Draft State Environmental Study will be available at udot.utah.gov/bangerter13400south beginning Jan. 17, 2022. Other meeting materials will be available on the study website starting on Jan. 19, 2022, at udot.utah.gov/bangerter13400south. Written comments should be sent to:

Bangerter Environmental c/o HDR
2825 East Cottonwood Parkway Suite 200
Cottonwood Heights, UT 84121

Comments may also be submitted at the in-person public meeting, via email at bangerter@utah.gov, or by calling the project hotline at 888-766-7623. Comments need to be submitted by Feb. 15, 2022, to be included in the official transcripts of the Public Hearing. Comments provided to the study team will be reviewed and considered by UDOT. All comments received will be documented in the project record. The study team will contact you if they need additional information or clarification.

If you have questions about the Public Hearings, please contact a study representative at 888-766-ROAD (7623) or bangerter@utah.gov, or visit udot.utah.gov/bangerter13400south.

In compliance with the Americans with Disabilities Act, individuals needing special accommodations (including auxiliary communicative aids and services) or language translation services during this meeting should notify the study team five days in advance at 888-766-ROAD (7623) or bangerter@utah.gov.

Para información en español, llame al 888-766-ROAD (7623).
DN0014799

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PUBLISHED ON 12/31/2021, 01/07/2022

DATE 01/07/2022

SIGNATURE

STATE OF UTAH
COUNTY OF Salt Lake

SUBSCRIBED AND SWORN TO BEFORE ME ON THIS 7th DAY OF JANUARY IN THE YEAR 2022

BY Lorainc Gudmundson

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COMMISSION# 712892
COMM. EXP. 07-06-2024

NOTARY PUBLIC SIGNATURE

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COTTONWOOD HEIGHTS, UT 84121

ACCOUNT NUMBER
6082

ACCOUNT NAME
HDR ENGINEERING, INC.

TELEPHONE
801-743-7820

ORDER #
SLT0015143

CUSTOMER REFERENCE NUMBER
18808_13400 S. Hearing

CAPTION
NOTICE OF PUBLIC HEARING On Proposed Improvements for the Bangerter Highway (S.R. 154) and 13400 South Intersection in Salt Lake County, UT; UDOT Project No.

TOTAL COST
$470.80

NOTICE OF PUBLIC HEARING

On Proposed Improvements for the
Bangerter Highway (S.R. 154) and 13400 South Intersection
in Salt Lake County, UT;
UDOT Project No. S-0154(92)0

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In-person
When: Wednesday, Jan. 19, 2022, from 6 – 7:30 p.m.
Where: South Hills Middle School, 13508 South 4000 West, Riverton, UT 84065

Online
When: Thursday, Jan. 20, 2022, from 6 – 7 p.m.
Where: Visit udot.utah.gov/bangerter13400south for instructions on how to join the online meeting.

Members of the public are invited to attend the Public Hearing and are encouraged to provide comments and feedback for consideration. Information to be presented at the meetings will include the Draft State Environmental Study which identifies a Proposed Action, the process used to identify the Proposed Action, environmental resources considered and appropriate mitigation. The team will also present the project schedule and will be available to answer questions.

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Bangerter Environmental c/o HDR
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Cottonwood Heights, UT 84121

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PUBLISHED ON 01/05/2022, 01/12/2022

DATE 01/12/2022

SIGNATURE Jordyn gallegos

STATE OF UTAH
COUNTY OF SALT LAKE

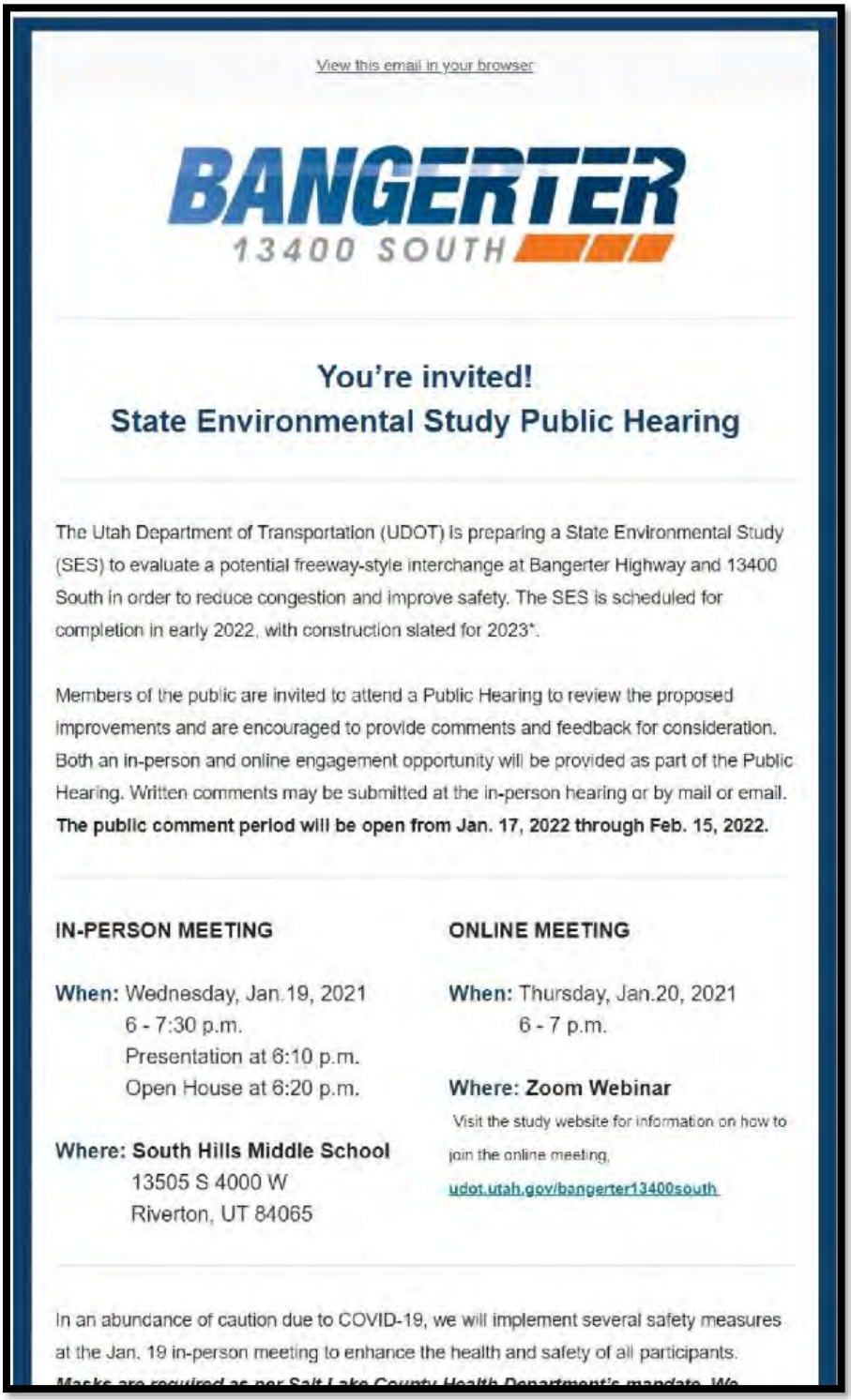
SUBSCRIBED AND SWORN TO BEFORE ME ON THIS 12th DAY OF JANUARY IN THE YEAR 2022

BY Jordyn Gallegos

MAKAYLA THEE
Notary Public, State of Utah
Commission # 718815
My Commission Expires
June 15, 2025

NOTARY PUBLIC SIGNATURE

Stakeholder Email Update



View this email in your browser

BANGERTER
13400 SOUTH

You're invited!
State Environmental Study Public Hearing

The Utah Department of Transportation (UDOT) is preparing a State Environmental Study (SES) to evaluate a potential freeway-style interchange at Bangerter Highway and 13400 South in order to reduce congestion and improve safety. The SES is scheduled for completion in early 2022, with construction slated for 2023*.

Members of the public are invited to attend a Public Hearing to review the proposed improvements and are encouraged to provide comments and feedback for consideration. Both an in-person and online engagement opportunity will be provided as part of the Public Hearing. Written comments may be submitted at the in-person hearing or by mail or email. **The public comment period will be open from Jan. 17, 2022 through Feb. 15, 2022.**

IN-PERSON MEETING

When: Wednesday, Jan.19, 2021
6 - 7:30 p.m.
Presentation at 6:10 p.m.
Open House at 6:20 p.m.

Where: South Hills Middle School
13505 S 4000 W
Riverton, UT 84065

ONLINE MEETING

When: Thursday, Jan.20, 2021
6 - 7 p.m.

Where: Zoom Webinar
Visit the study website for information on how to join the online meeting.
udot.utah.gov/bangerter13400south

In an abundance of caution due to COVID-19, we will implement several safety measures at the Jan. 19 in-person meeting to enhance the health and safety of all participants.
Masks are required as per Salt Lake County Health Department's mandate. We

politely ask that attendance is limited to two people per property. Please do not attend if you are sick or have recently been exposed.

If you are unable or prefer not to attend in-person, you can call or email the project team to set up a separate appointment. Project information will also be available during the online meeting scheduled for Jan. 20, from 6-7 p.m. Visit udot.utah.gov/bangerter13400south to register.



The same information and materials will be available at both meetings. If you cannot participate in either opportunity, materials can be reviewed on the project website and feedback can be sent via email or postage. The draft SES will be available on the project website on Jan. 17, 2022.

**Environmental studies are process-driven, meaning this schedule is approximate and subject to change.*

For project information
Para información en español:
Hotline (*Número de teléfono*): (888) 766-7628
Email (*Correo electrónico*): bangerter@utah.gov
Web (*Sitio web*): udot.utah.gov/bangerter13400south

Know before you go. Check UDOT Traffic before hitting the road.

Public Hearing Social Media Notification

Riverton Facebook



Riverton Instagram



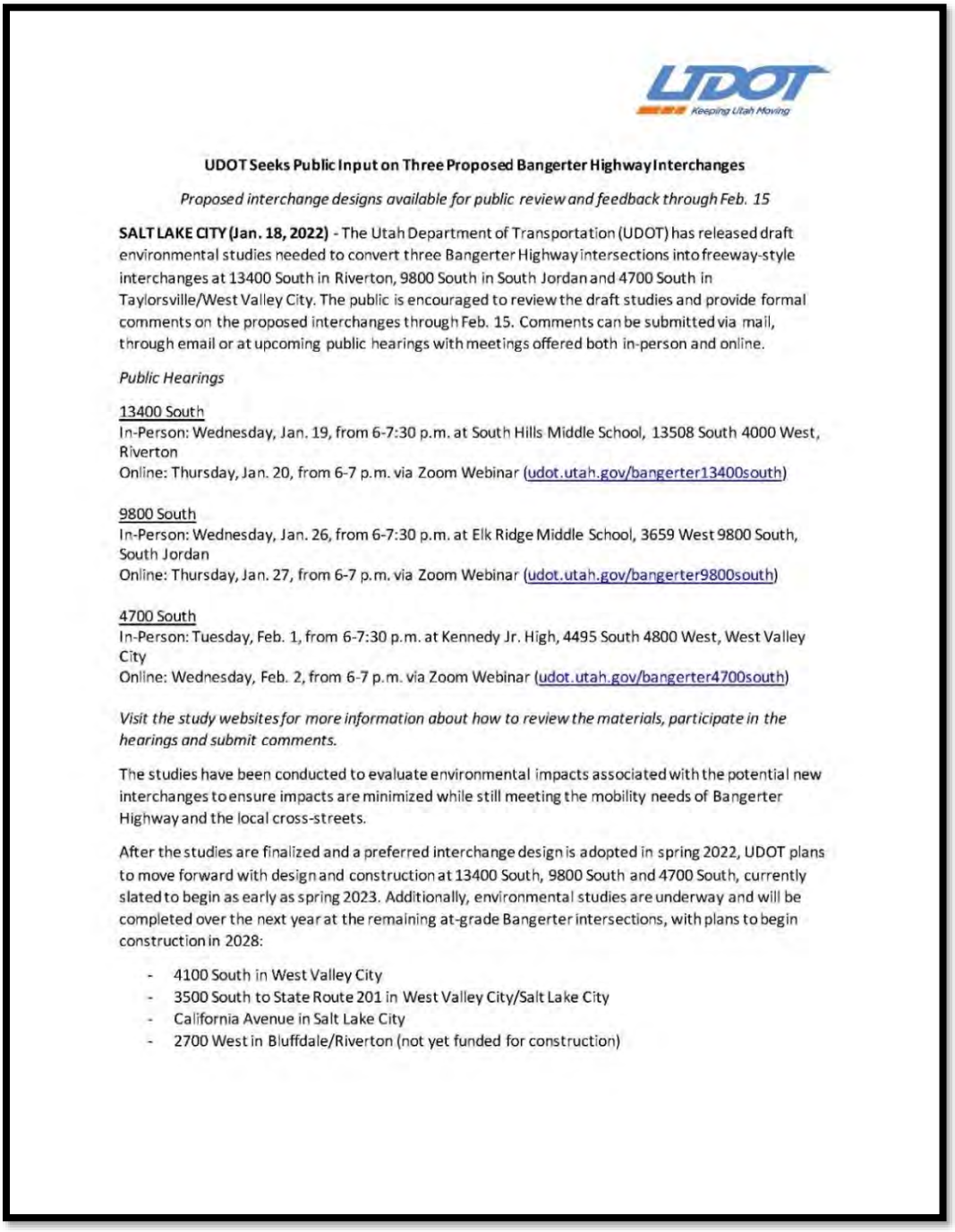
Riverton Twitter



UDOT Region Two Twitter



Media Release



UDOT Seeks Public Input on Three Proposed Bangerter Highway Interchanges

Proposed interchange designs available for public review and feedback through Feb. 15

SALT LAKE CITY (Jan. 18, 2022) - The Utah Department of Transportation (UDOT) has released draft environmental studies needed to convert three Bangerter Highway intersections into freeway-style interchanges at 13400 South in Riverton, 9800 South in South Jordan and 4700 South in Taylorsville/West Valley City. The public is encouraged to review the draft studies and provide formal comments on the proposed interchanges through Feb. 15. Comments can be submitted via mail, through email or at upcoming public hearings with meetings offered both in-person and online.

Public Hearings

13400 South
In-Person: Wednesday, Jan. 19, from 6-7:30 p.m. at South Hills Middle School, 13508 South 4000 West, Riverton
Online: Thursday, Jan. 20, from 6-7 p.m. via Zoom Webinar (udot.utah.gov/bangerter13400south)

9800 South
In-Person: Wednesday, Jan. 26, from 6-7:30 p.m. at Elk Ridge Middle School, 3659 West 9800 South, South Jordan
Online: Thursday, Jan. 27, from 6-7 p.m. via Zoom Webinar (udot.utah.gov/bangerter9800south)

4700 South
In-Person: Tuesday, Feb. 1, from 6-7:30 p.m. at Kennedy Jr. High, 4495 South 4800 West, West Valley City
Online: Wednesday, Feb. 2, from 6-7 p.m. via Zoom Webinar (udot.utah.gov/bangerter4700south)

Visit the study websites for more information about how to review the materials, participate in the hearings and submit comments.

The studies have been conducted to evaluate environmental impacts associated with the potential new interchanges to ensure impacts are minimized while still meeting the mobility needs of Bangerter Highway and the local cross-streets.

After the studies are finalized and a preferred interchange design is adopted in spring 2022, UDOT plans to move forward with design and construction at 13400 South, 9800 South and 4700 South, currently slated to begin as early as spring 2023. Additionally, environmental studies are underway and will be completed over the next year at the remaining at-grade Bangerter intersections, with plans to begin construction in 2028:

- 4100 South in West Valley City
- 3500 South to State Route 201 in West Valley City/Salt Lake City
- California Avenue in Salt Lake City
- 2700 West in Bluffdale/Riverton (not yet funded for construction)

"UDOT is prioritizing the completion of Bangerter Highway to improve safety and mobility along this critical corridor," said Brian Allen, UDOT Project Manager. "When the conversion to a freeway is complete and traffic can flow freely without stoplights, we expect to see a significant reduction in crashes and in time driving both north and south on Bangerter Highway and east and west on cross-streets. In fact, traffic projections show that when all is said and done, the time it takes to drive from I-15 in Draper to the Salt Lake International Airport via Bangerter will be reduced by up to 20 minutes," Allen said.

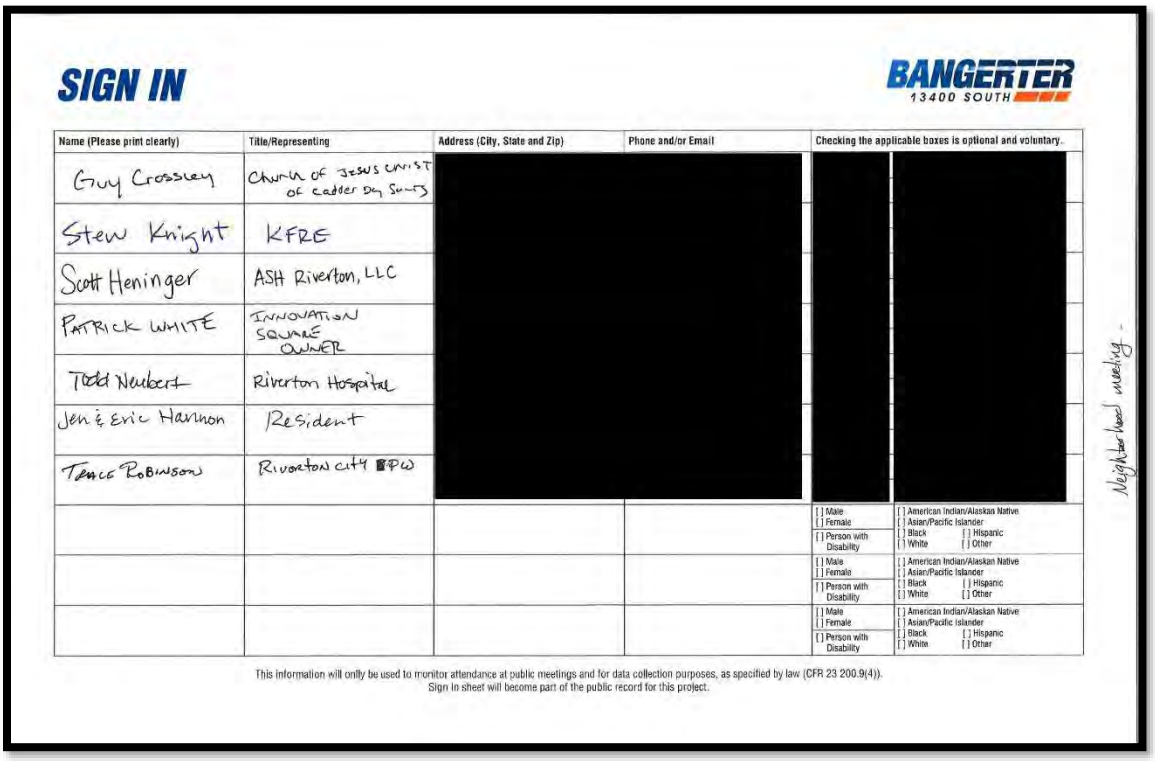
Visit udot.utah.gov/bangerter for more information and to sign up for updates.

-UDOT-

Media Contact:
John Gleason
UDOT Public Information Officer
jgleason@utah.gov
801-560-7740

Appendix B Attendance

Neighborhood Meeting Sign-In Sheets



SIGN IN

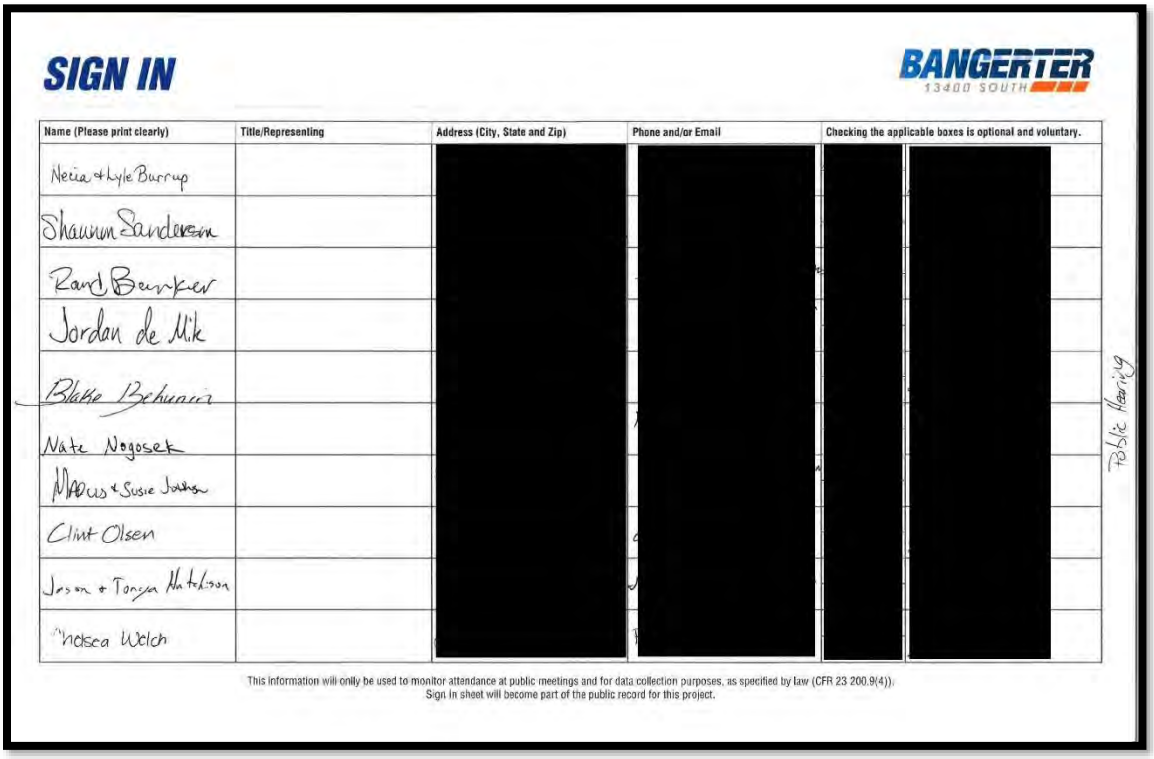
BANGERTER 13400 SOUTH

Name (Please print clearly)	Title/Representing	Address (City, State and Zip)	Phone and/or Email	Checking the applicable boxes is optional and voluntary.	
Guy Crossley	Church of Jesus Christ of Latter Day Saints	[redacted]		[redacted]	[redacted]
Stew Knight	KFRE				
Scott Heninger	ASH Riverton, LLC				
PATRICK WHITE	INNOVATION SQUARE OWNER				
Todd Neubert	Riverton Hospital				
Jen & Eric Harmon	Resident				
TRACE ROBINSON	Riverton City [redacted]				
				[ ] Male [ ] Female [ ] Person with Disability	[ ] American Indian/Alaskan Native [ ] Asian/Pacific Islander [ ] Black [ ] Hispanic [ ] White [ ] Other
				[ ] Male [ ] Female [ ] Person with Disability	[ ] American Indian/Alaskan Native [ ] Asian/Pacific Islander [ ] Black [ ] Hispanic [ ] White [ ] Other
				[ ] Male [ ] Female [ ] Person with Disability	[ ] American Indian/Alaskan Native [ ] Asian/Pacific Islander [ ] Black [ ] Hispanic [ ] White [ ] Other

Neighborhood meeting

This information will only be used to monitor attendance at public meetings and for data collection purposes, as specified by law (CFR 23 200.9(4)).
Sign in sheet will become part of the public record for this project.

Public Hearing In-person Sign-in Sheets



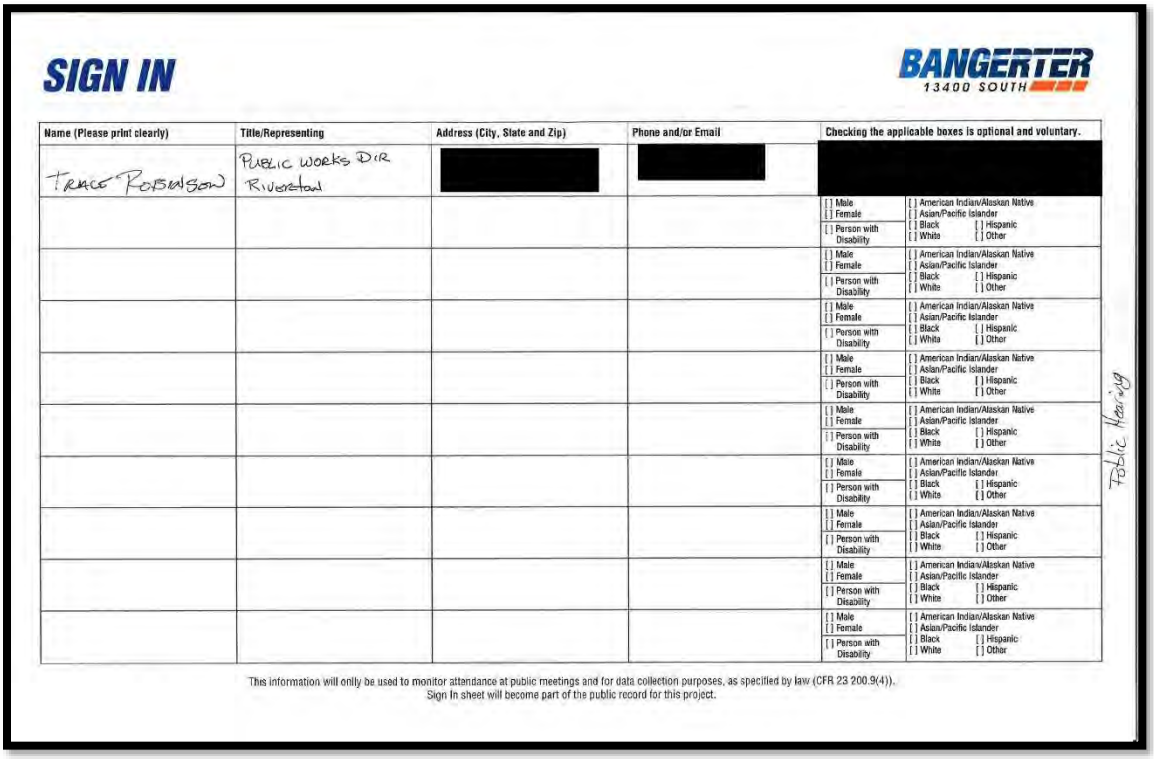
SIGN IN

BANGERTER 13400 SOUTH

Name (Please print clearly)	Title/Representing	Address (City, State and Zip)	Phone and/or Email	Checking the applicable boxes is optional and voluntary.
Nelia & Lyle Burrup		[redacted]	[redacted]	[redacted]
Shawnn Sanderson				
Rand Bunker				
Jordan de Mik				
Blake Behunin				
Nate Nogosek				
Marcus & Susie Jones				
Clint Olsen				
Jason & Tonya Matheson				
Melissa Welch				

Public Hearing

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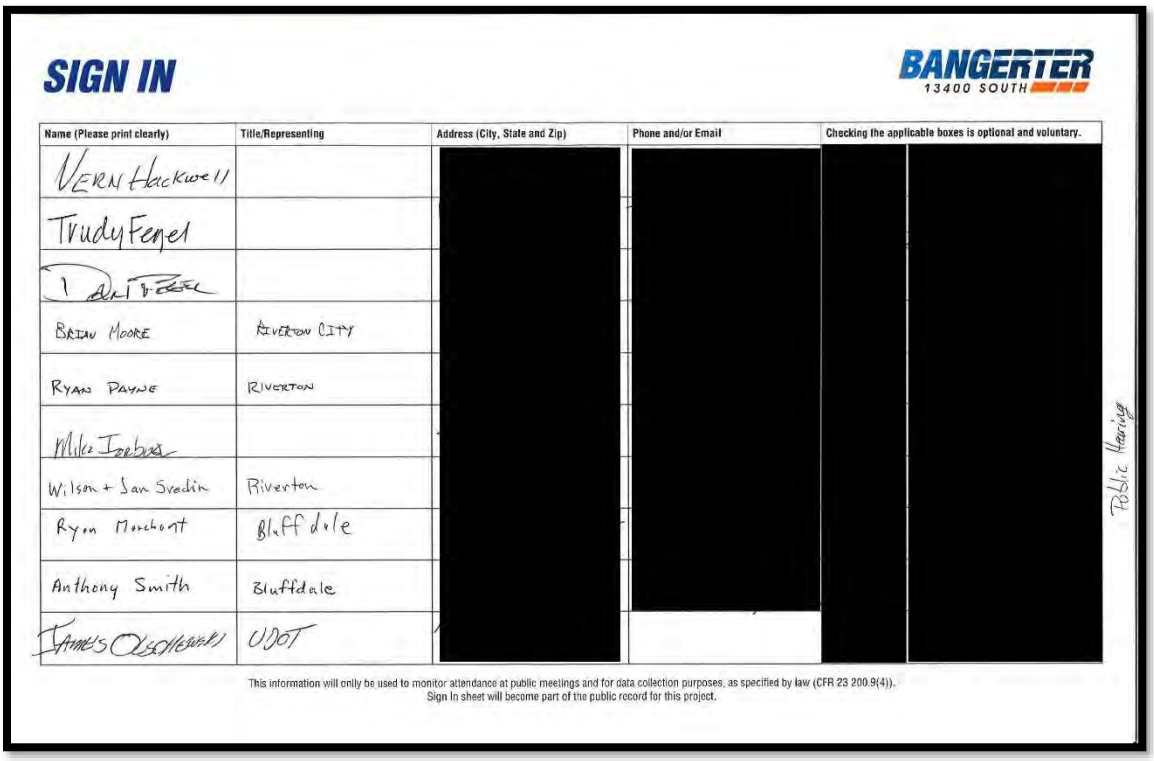
SIGN IN

BANGERTER 13400 SOUTH

Name (Please print clearly)	Title/Representing	Address (City, State and Zip)	Phone and/or Email	Checking the applicable boxes is optional and voluntary.
Trace Robinson	Public Works Dir Riverton	[redacted]	[redacted]	[redacted]
				[ ] Male [ ] Female [ ] Person with Disability; [ ] American Indian/Alaskan Native [ ] Asian/Pacific Islander [ ] Black [ ] Hispanic [ ] White [ ] Other
				[ ] Male [ ] Female [ ] Person with Disability; [ ] American Indian/Alaskan Native [ ] Asian/Pacific Islander [ ] Black [ ] Hispanic [ ] White [ ] Other
				[ ] Male [ ] Female [ ] Person with Disability; [ ] American Indian/Alaskan Native [ ] Asian/Pacific Islander [ ] Black [ ] Hispanic [ ] White [ ] Other
				[ ] Male [ ] Female [ ] Person with Disability; [ ] American Indian/Alaskan Native [ ] Asian/Pacific Islander [ ] Black [ ] Hispanic [ ] White [ ] Other
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				[ ] Male [ ] Female [ ] Person with Disability; [ ] American Indian/Alaskan Native [ ] Asian/Pacific Islander [ ] Black [ ] Hispanic [ ] White [ ] Other

Public Hearing

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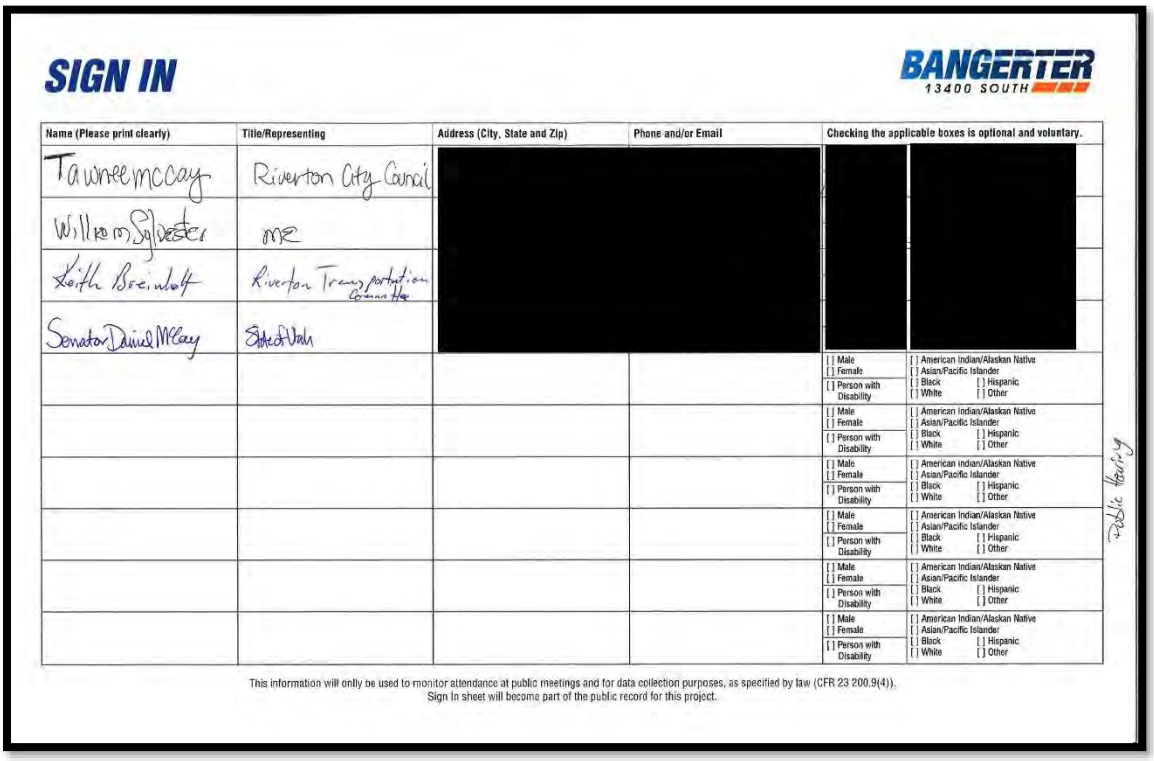
SIGN IN

BANGERTER 13400 SOUTH

Name (Please print clearly)	Title/Representing	Address (City, State and Zip)	Phone and/or Email	Checking the applicable boxes is optional and voluntary.
Vern Hackwell		[redacted]	[redacted]	[redacted]
Trudy Fegel				
[illegible]				
Brian Moore	Riverton City			
Ryan Payne	Riverton			
Mike Isaacson				
Wilson + Jan Svedin	Riverton			
Ryan Merchant	Bluffdale			
Anthony Smith	Bluffdale			
James Olsen	UDOT			

Public Hearing

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Sign In sheet will become part of the public record for this project.



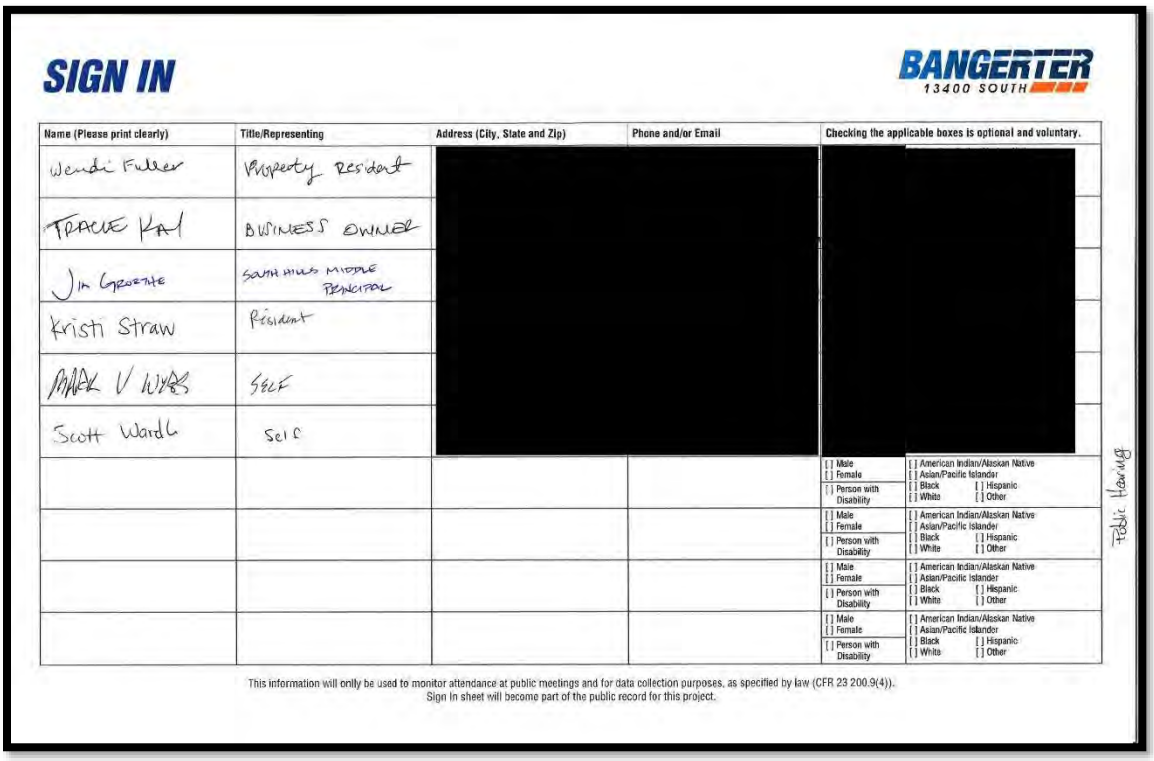
SIGN IN

BANGERTER 13400 SOUTH

Name (Please print clearly)	Title/Representing	Address (City, State and Zip)	Phone and/or Email	Checking the applicable boxes is optional and voluntary.
Tawnee McCay	Riverton City Council	[redacted]	[redacted]	[redacted]
William Sylvester	me			
Keith Boeinhoff	Riverton Transportation Committee			
Senator David McCay	State of Utah			
				[ ] Male [ ] Female [ ] Person with Disability; [ ] American Indian/Alaskan Native [ ] Asian/Pacific Islander [ ] Black [ ] Hispanic [ ] White [ ] Other
				[ ] Male [ ] Female [ ] Person with Disability; [ ] American Indian/Alaskan Native [ ] Asian/Pacific Islander [ ] Black [ ] Hispanic [ ] White [ ] Other
				[ ] Male [ ] Female [ ] Person with Disability; [ ] American Indian/Alaskan Native [ ] Asian/Pacific Islander [ ] Black [ ] Hispanic [ ] White [ ] Other
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				[ ] Male [ ] Female [ ] Person with Disability; [ ] American Indian/Alaskan Native [ ] Asian/Pacific Islander [ ] Black [ ] Hispanic [ ] White [ ] Other

Public Hearing

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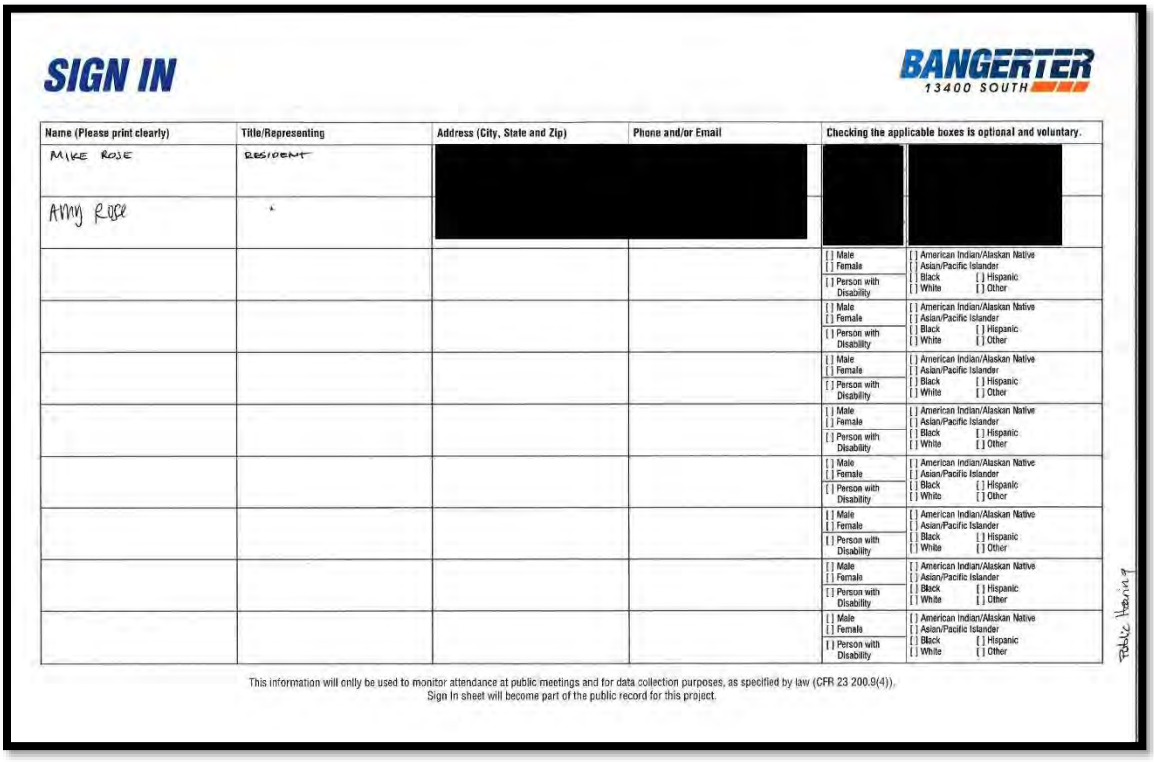
SIGN IN

BANGERTER 13400 SOUTH

Name (Please print clearly)	Title/Representing	Address (City, State and Zip)	Phone and/or Email	Checking the applicable boxes is optional and voluntary.	
Wendi Fuller	Property Resident	[redacted]			
TRACIE KAY	BUSINESS OWNER				
JIM GRENTE	SOUTH HILLS MIDDLE PRINCIPAL				
Kristi Straw	Resident				
MARK V WYAS	SELF				
Scott Wardle	Self				
				[ ] Male [ ] Female [ ] Person with Disability	[ ] American Indian/Alaskan Native [ ] Asian/Pacific Islander [ ] Black [ ] Hispanic [ ] White [ ] Other
				[ ] Male [ ] Female [ ] Person with Disability	[ ] American Indian/Alaskan Native [ ] Asian/Pacific Islander [ ] Black [ ] Hispanic [ ] White [ ] Other
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Public Hearing

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Sign In sheet will become part of the public record for this project.



SIGN IN

BANGERTER 13400 SOUTH

Name (Please print clearly)	Title/Representing	Address (City, State and Zip)	Phone and/or Email	Checking the applicable boxes is optional and voluntary.	
MIKE ROSE	RESIDENT	[redacted]			
Amy Rose	"				
				[ ] Male [ ] Female [ ] Person with Disability	[ ] American Indian/Alaskan Native [ ] Asian/Pacific Islander [ ] Black [ ] Hispanic [ ] White [ ] Other
				[ ] Male [ ] Female [ ] Person with Disability	[ ] American Indian/Alaskan Native [ ] Asian/Pacific Islander [ ] Black [ ] Hispanic [ ] White [ ] Other
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Public Hearing

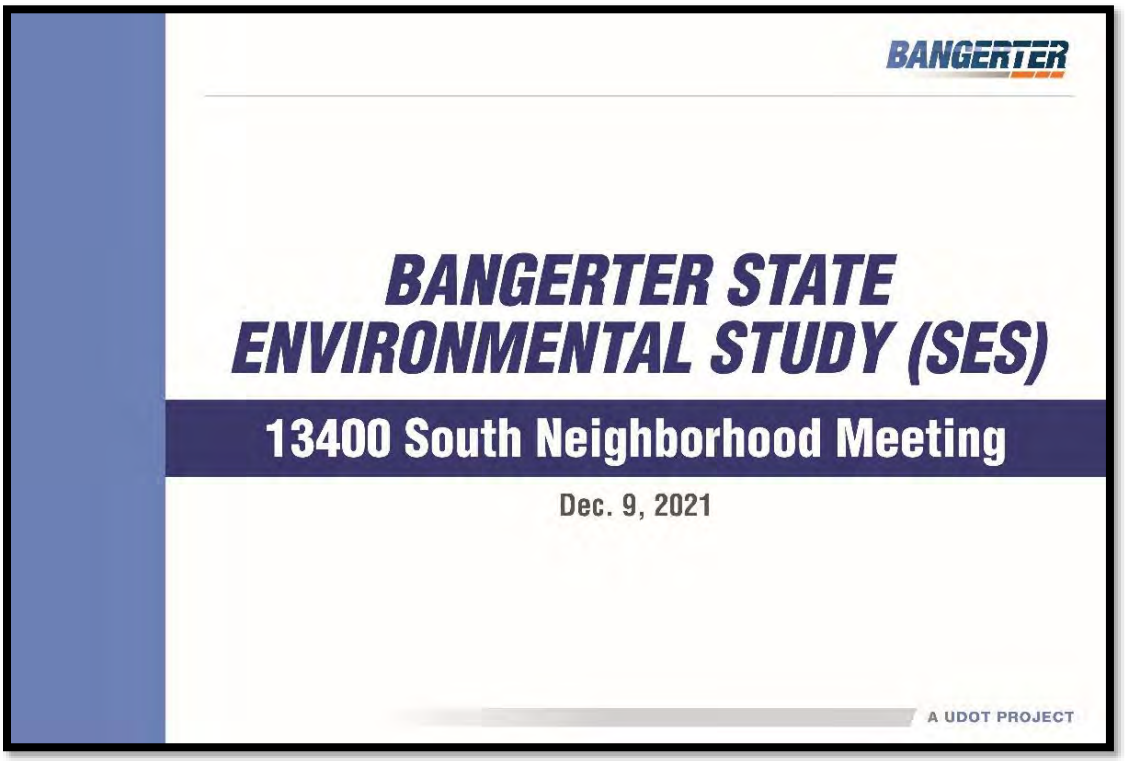
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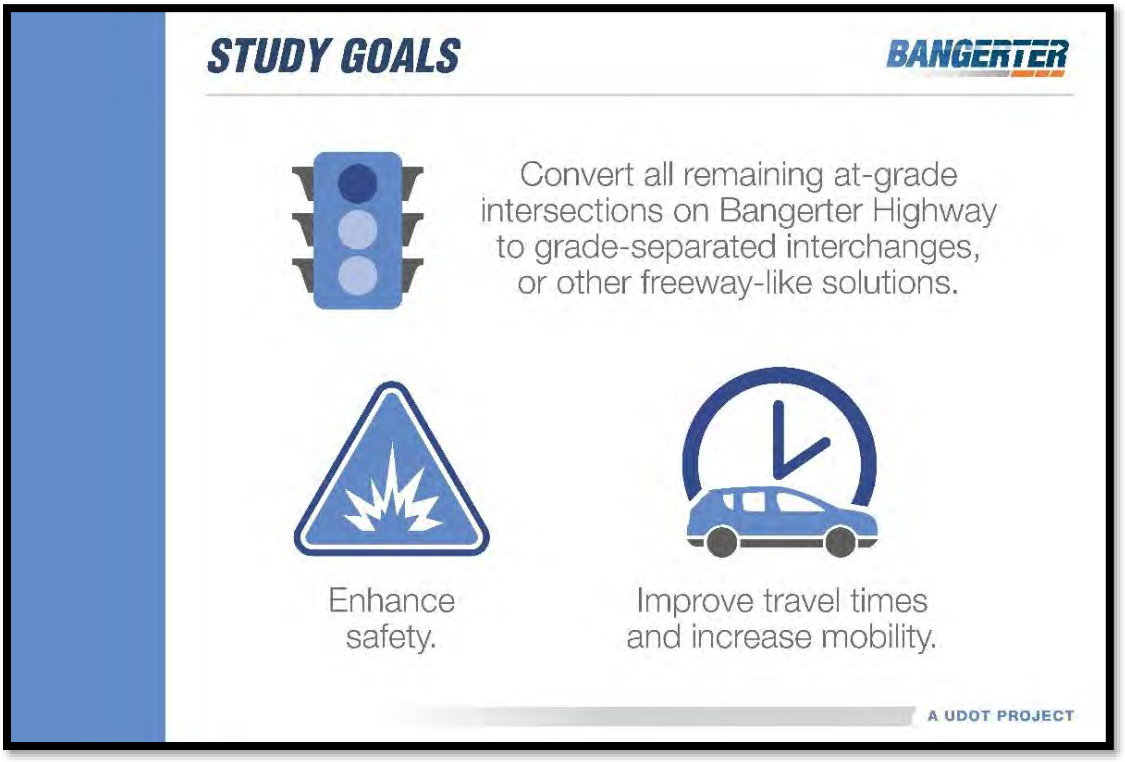
Online Public Meeting Sign-In Information

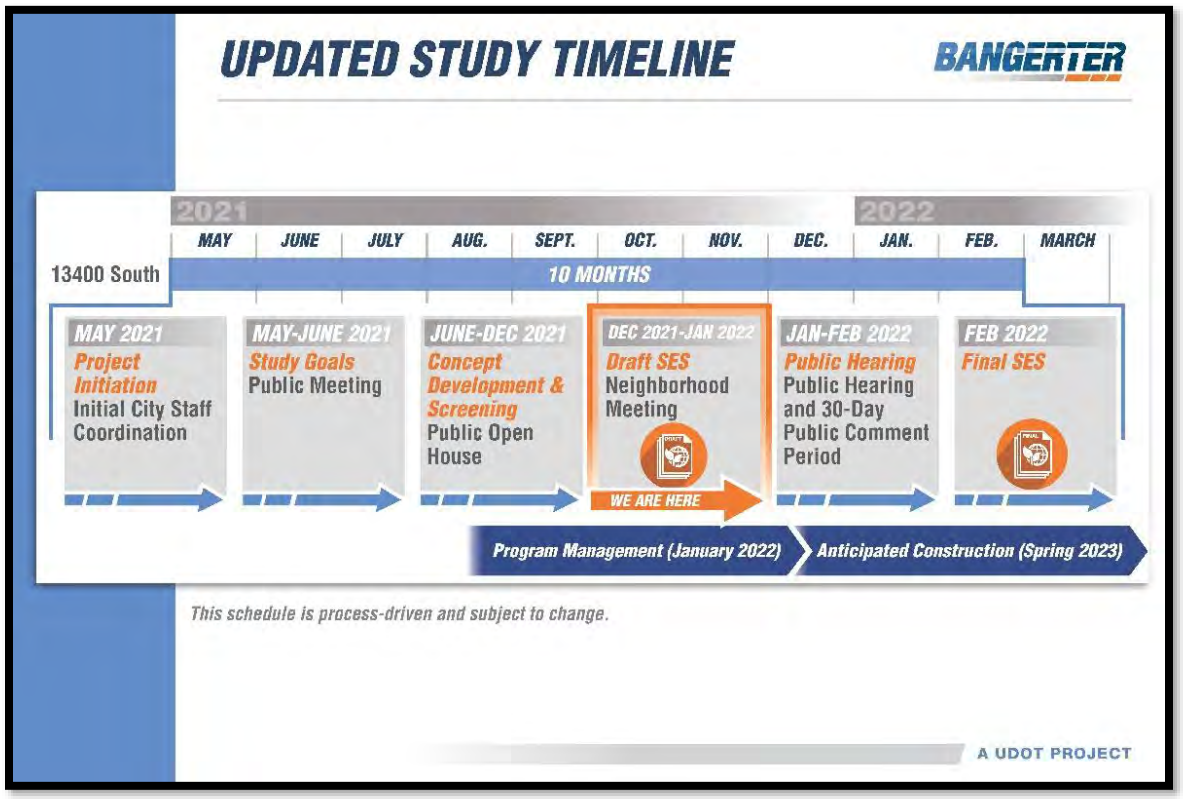
Bangerter 13400 South Public Hearing Online Meeting Attendee Report			
First Name	**Last Name**	**Time in**	**Zip**
Darrin	Reed	12	84096
Aaron	Dodson	56	84096
Mardi	Pearson	60	84107-4061
Prescott	Pratt	--	84096
Joshua	Bastian	60	84065
Keith	Crane	59	84065
Matthew	Condie	42	84065
Di	He	27	84065
Tiffany	Janzen	54	84092
Leif	Erikson	36	84096
Mark	Cathey	41	84065
Patti	Scott	59	84065
Rusty	Monson	13	84065
TeJay	Griffiths	4	84065
Brandon	Cook	17	84096
Justin	Anderson	59	84020
Beverly	Holloway	32	84065
Robert	Lemke	60	85226-2331
Heather	Hinckley	12	84065
Kyle	Law	59	84096
Norm	Badger	58	84095
Brad	Llewelyn	46	84065
Erwin	Lozano	60	84065
MAX	JENKINS	39	84096
Neil	Ditty	38	84096
David	Douglas	59	84096
Daniel	Chadwell	59	84065
Chris	Lyon	60	84096
Erioc	Leeson	57	84065
Becky	Condie	59	84065
Paul	Farnsworth	59	84065

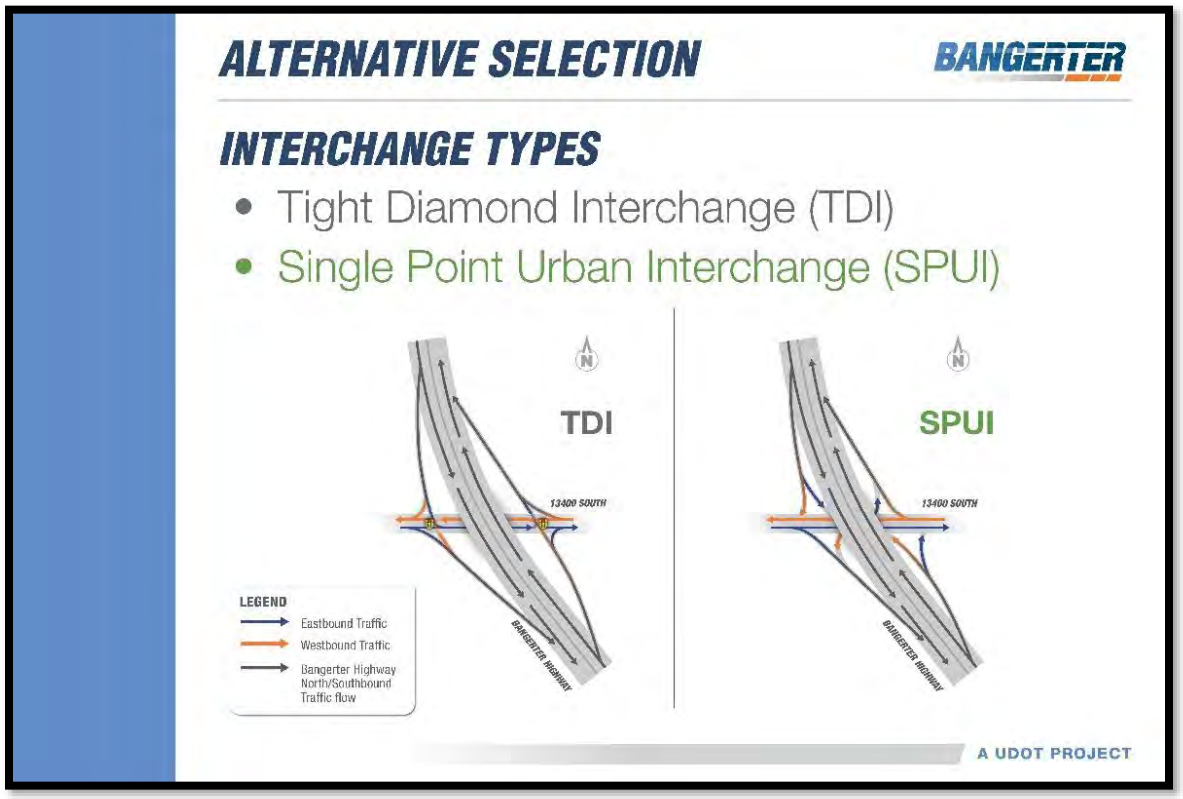
Appendix C Meeting Materials

Neighborhood Meeting Presentation Slides






UPDATED STUDY TIMELINE
BANGERTER
2021
2022
MAY
JUNE
JULY
AUG.
SEPT.
OCT.
NOV.
DEC.
JAN.
FEB.
MARCH
13400 South
10 MONTHS
MAY 2021
Project Initiation
Initial City Staff Coordination
MAY-JUNE 2021
Study Goals
Public Meeting
JUNE-DEC 2021
Concept Development & Screening
Public Open House
DEC 2021-JAN 2022
Draft SES
Neighborhood Meeting
WE ARE HERE
JAN-FEB 2022
Public Hearing
Public Hearing and 30-Day Public Comment Period
FEB 2022
Final SES
Program Management (January 2022)
Anticipated Construction (Spring 2023)
This schedule is process-driven and subject to change.
A UDOT PROJECT


ALTERNATIVE SELECTION
BANGERTER
INTERCHANGE TYPES
Tight Diamond Interchange (TDI)
Single Point Urban Interchange (SPUI)
TDI
SPUI
13400 SOUTH
BANGERTER HIGHWAY
LEGEND
Eastbound Traffic
Westbound Traffic
Bangerter Highway North/Southbound Traffic flow
A UDOT PROJECT

ALTERNATIVE SELECTION

BANGERTER

HORIZONTAL ALIGNMENTS

- East Shift
- Center Widening
- West Shift



A UDOT PROJECT

VERTICAL ALIGNMENTS

BANGERTER

Bangerter Over



~$99 Million

Bangerter Under



~$119 Million

Bangerter Hybrid



~$104 Million

All options will require the removal of the current pedestrian crossing over Bangerter Highway. Relocation of the structure is dependent on funding and not included in estimated costs.

A UDOT PROJECT

BANGERTER OVER

BANGERTER



Example: 7800 South in West Jordan

- Lowest cost
- No Riverton City contribution
- Minor utility impacts
- 18 impacted properties

A UDOT PROJECT

BANGERTER UNDER

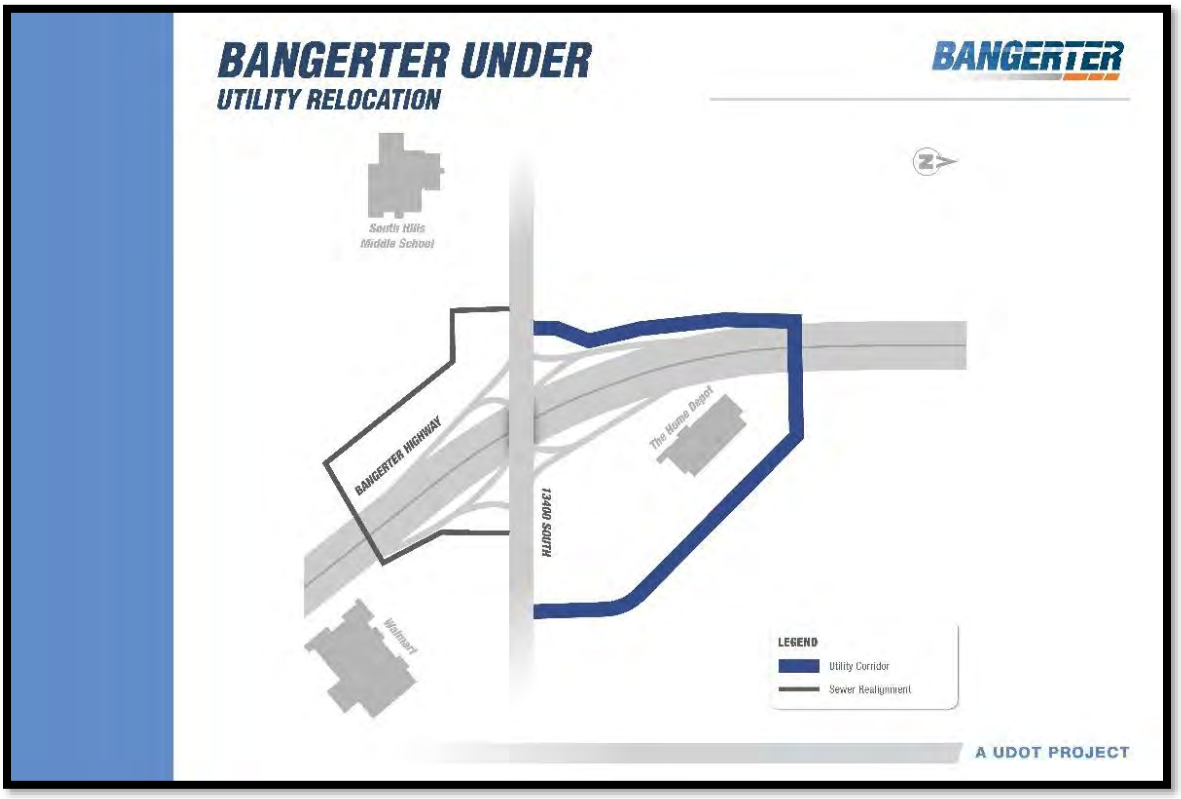
BANGERTER



Example: 11400 South in South Jordan

- Highest cost
- Additional cost to go under: $22 million (split 50/50 by Riverton City and UDOT)
- Significant utility impacts and relocations
- 19 impacted properties

A UDOT PROJECT

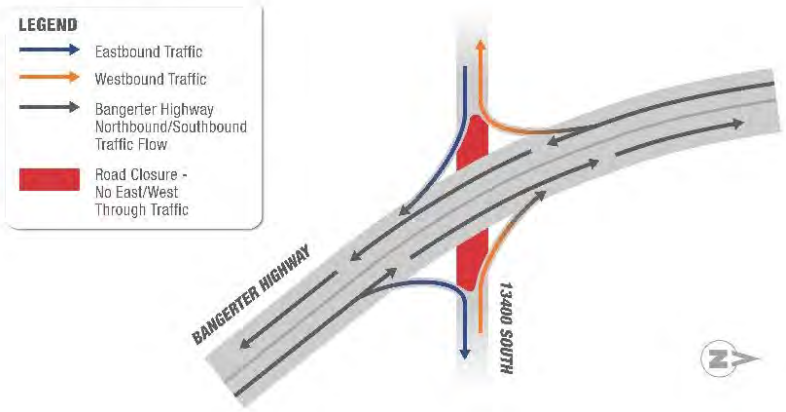

BANGERTER UNDER
UTILITY RELOCATION
BANGERTER
South Hills Middle School
BANGERTER HIGHWAY
13400 SOUTH
The Home Depot
Walmart
LEGEND
Utility Corridor
Sewer Realignment
A UDOT PROJECT


BANGERTER HYBRID
BANGERTER
Example: 12600 South in Riverton
• Mid-range cost
• Additional cost for hybrid: $5 million (split 50/50 by Riverton City and UDOT)
• Some utility relocations
• Lower elevation than Bangerter Over
• 21 impacted properties
A UDOT PROJECT

CROSS-STREET CLOSURE

BANGERTER

Each vertical alignment could require a **9-12 month closure** of 13400 South for safety and maintenance of traffic.



A UDOT PROJECT

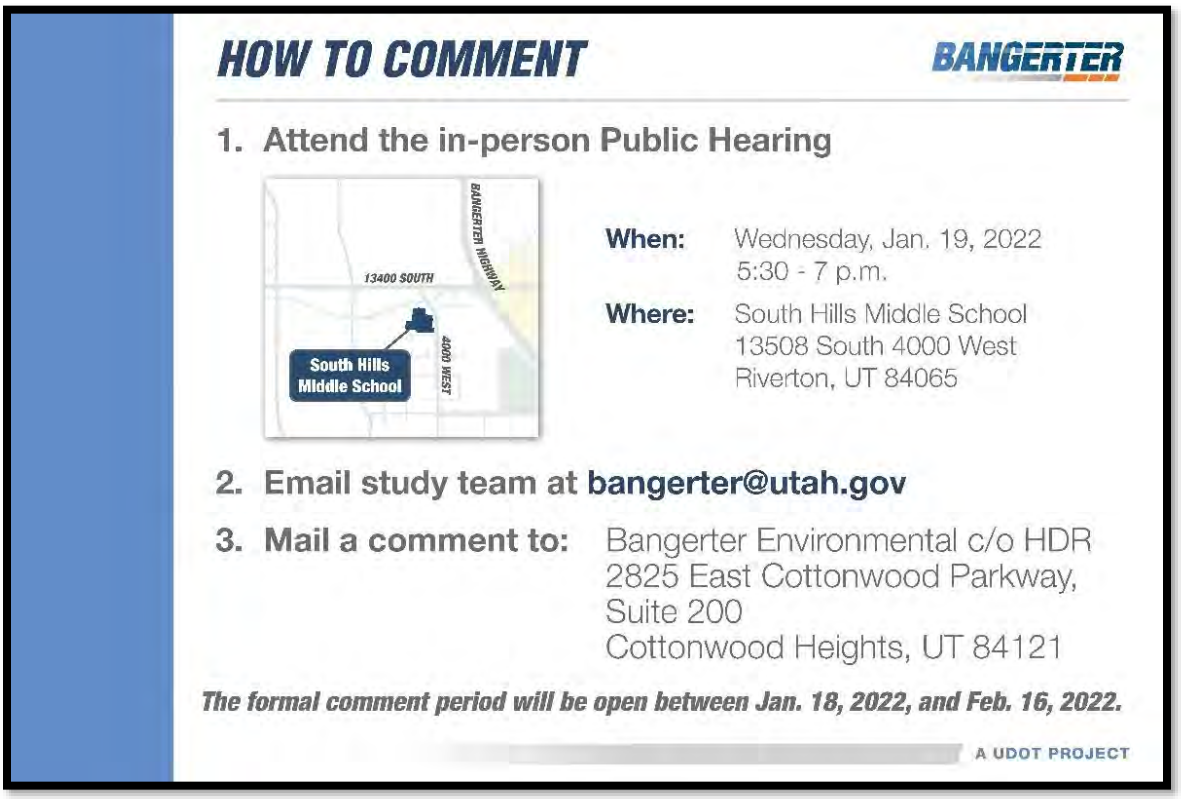
RIGHT-OF-WAY ACQUISITION PROCESS

BANGERTER

1. **Identification** — The study team identifies what properties will be needed to construct the selected alternative.
2. **Contact** — Property owners will be contacted directly if their property is identified as a full or partial acquisition.
3. **Valuation** — Right-of-way (ROW) professionals will estimate the value of property.
4. **Acquisition** — ROW professionals will work closely with the property owner to acquire needed property at fair market value.

A UDOT PROJECT

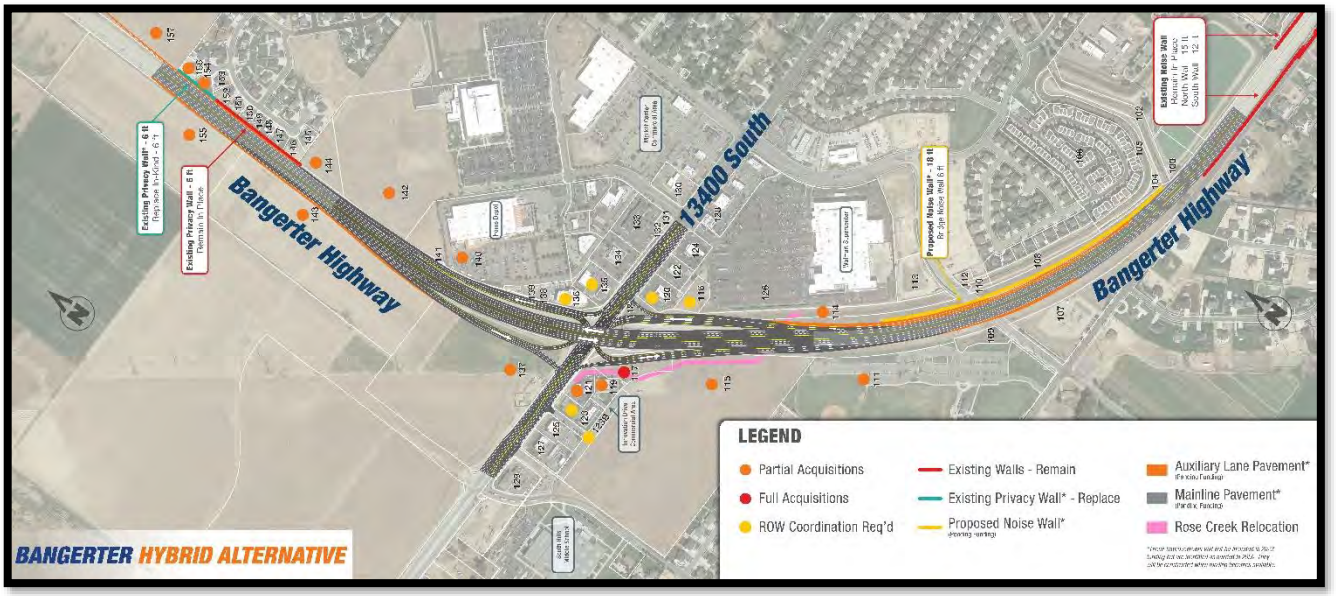

NEXT STEPS
BANGERTER
2021
2022
2023
DEC 2021
JAN-FEB 2022
FEB-MAR 2022
MAR 2022-SPRING 2023
Neighborhood Meeting
Release Draft SES
Public Comment Period
In-Person Public Hearing
Online Public Hearing
Release Final SES
Contractor Procurement
Public Notification of Design Selection
Construction Scheduled to Begin
ROW Process
This schedule is process-driven and subject to change.
A UDOT PROJECT


HOW TO COMMENT
BANGERTER
1. Attend the in-person Public Hearing
BANGERTER HIGHWAY
13400 SOUTH
4000 WEST
South Hills Middle School
When: Wednesday, Jan. 19, 2022
5:30 - 7 p.m.
Where: South Hills Middle School
13508 South 4000 West
Riverton, UT 84065
2. Email study team at bangerter@utah.gov
3. Mail a comment to: Bangerter Environmental c/o HDR
2825 East Cottonwood Parkway,
Suite 200
Cottonwood Heights, UT 84121
The formal comment period will be open between Jan. 18, 2022, and Feb. 16, 2022.
A UDOT PROJECT

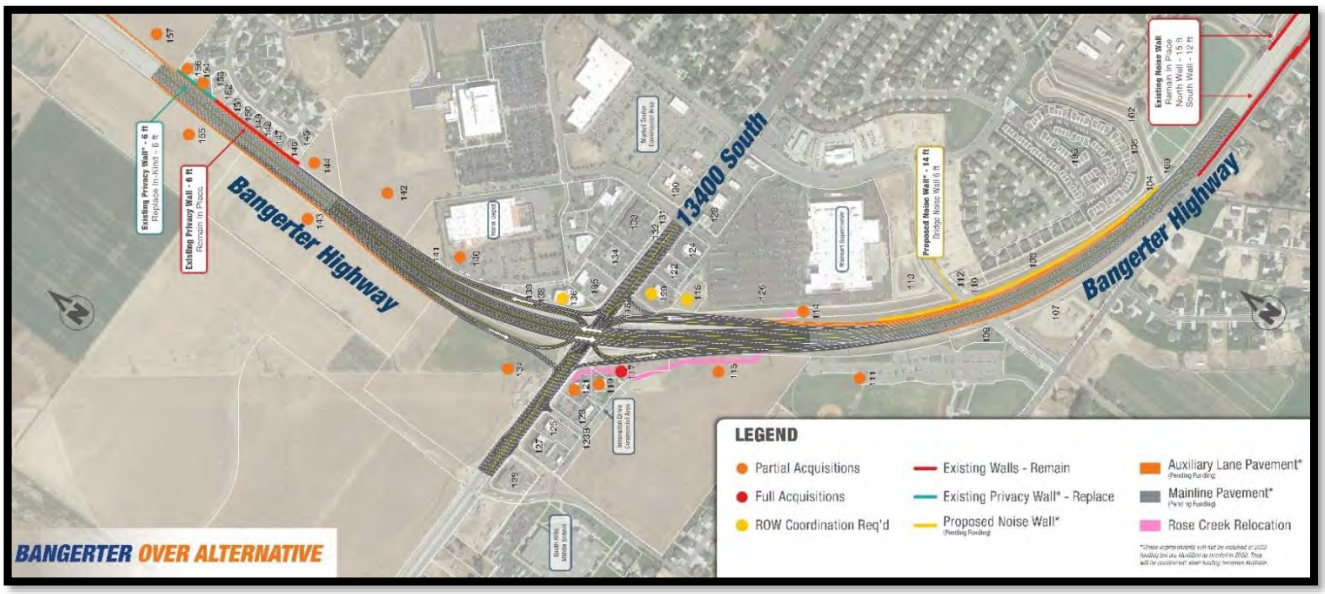

CONTACT US
BANGERTER
Hotline: 888-766-ROAD (7623)
Email: bangerter@utah.gov
Website: udot.utah.gov/bangerter13400south
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Neighborhood Meeting Scroll Plots

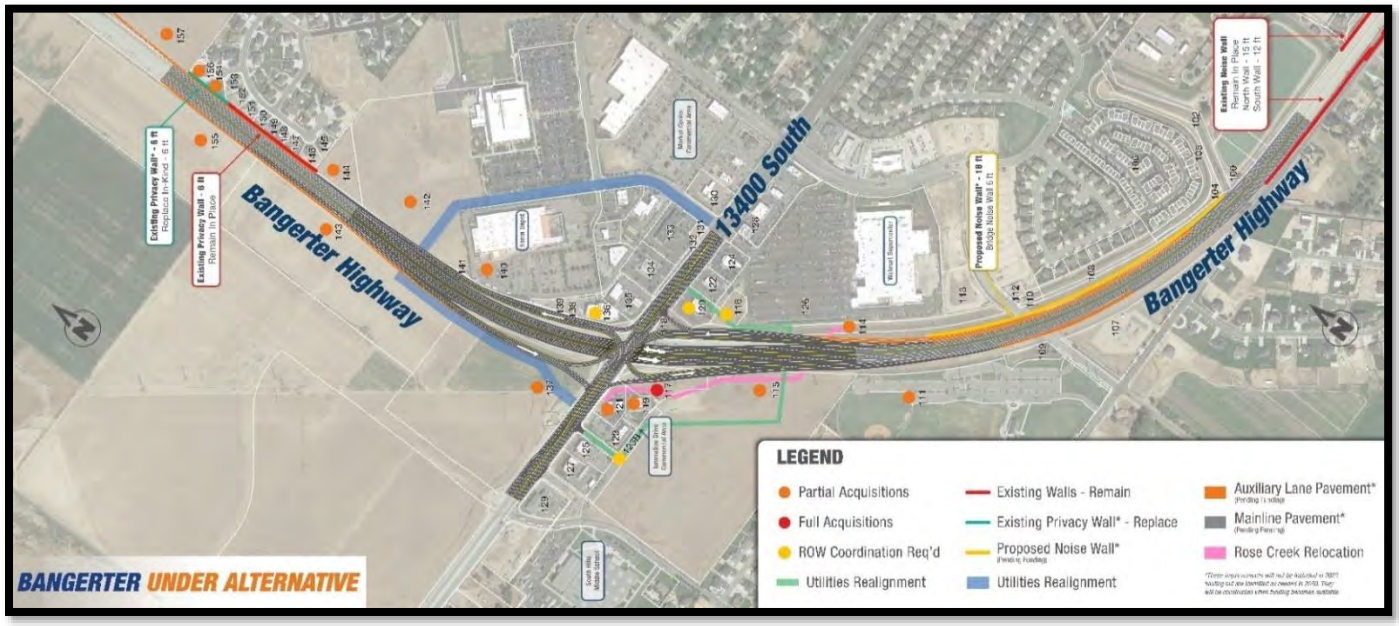
Hybrid Alternative



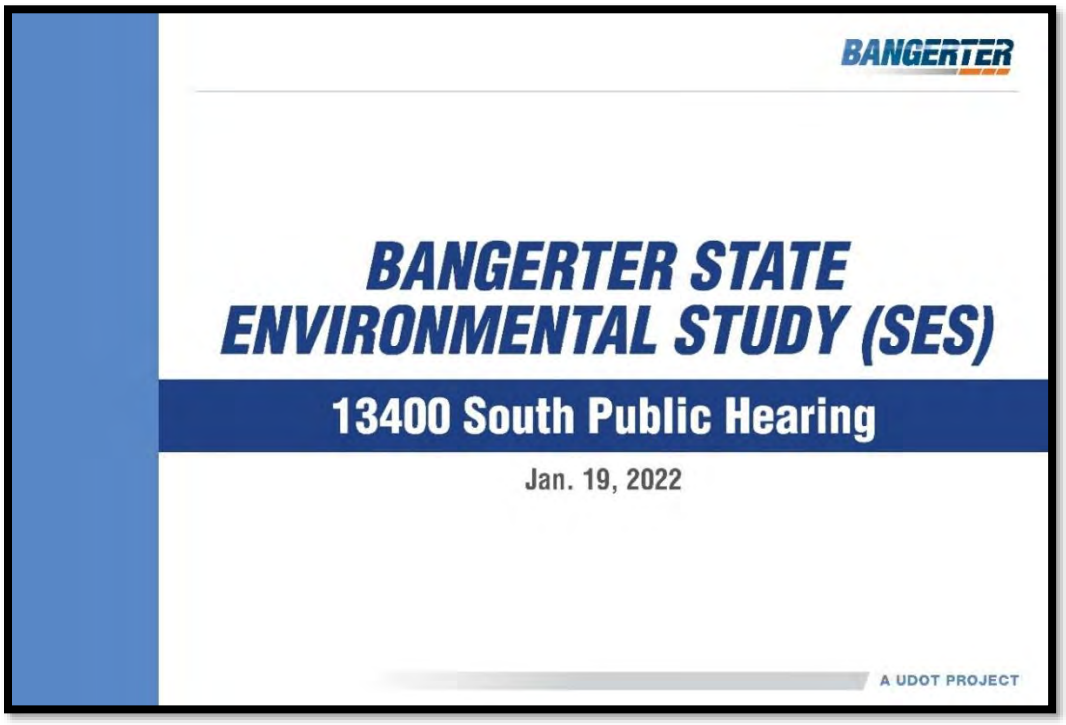
Over Alternative



Under Alternative



Public Hearing Presentation Slides





Q&A

BANGERTER

1. TO SUBMIT A QUESTION

Click on the Q&A button at the bottom of the screen

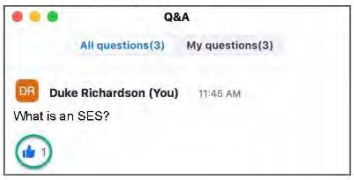


Type question in the Q&A Window



2. TO LIKE OR UPVOTE A QUESTION

Click on the "thumbs-up- botton underneath questions



This helps us to know how many people have the same question



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STUDY GOALS

BANGERTER



Convert all remaining at-grade intersections on Bangerter Highway to grade-separated interchanges, or other freeway-like solutions.

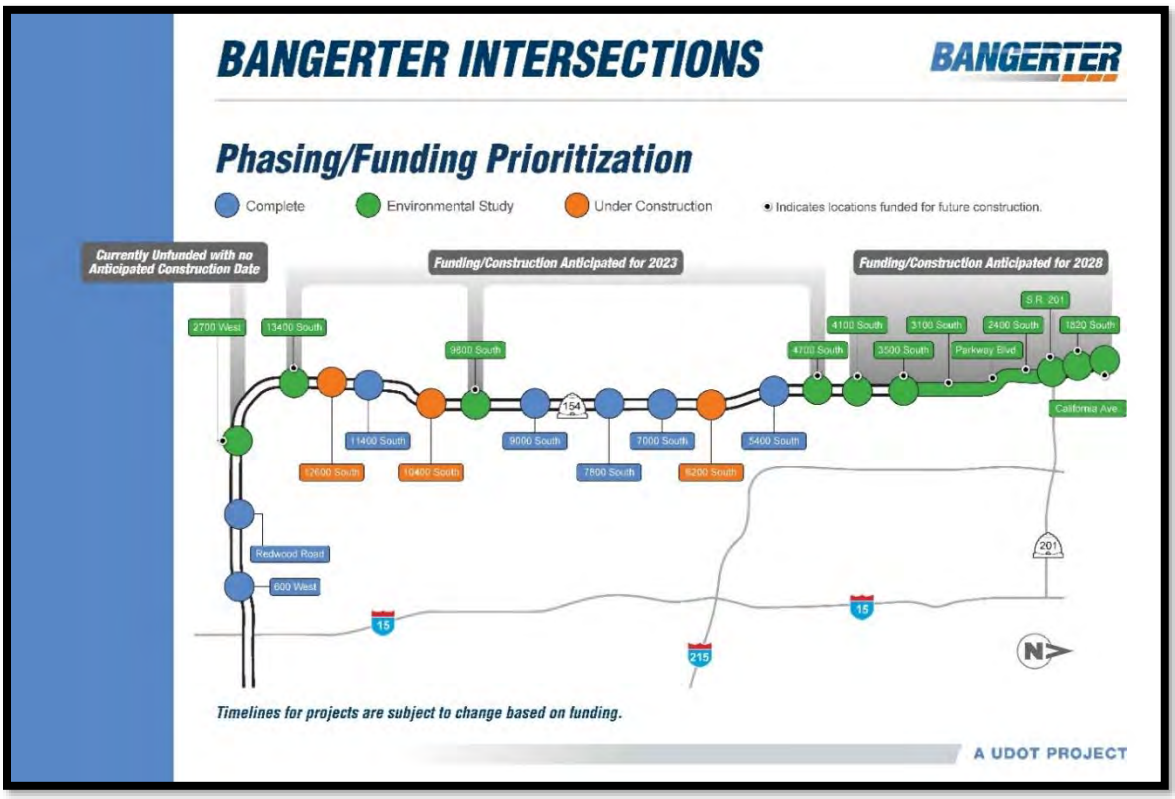


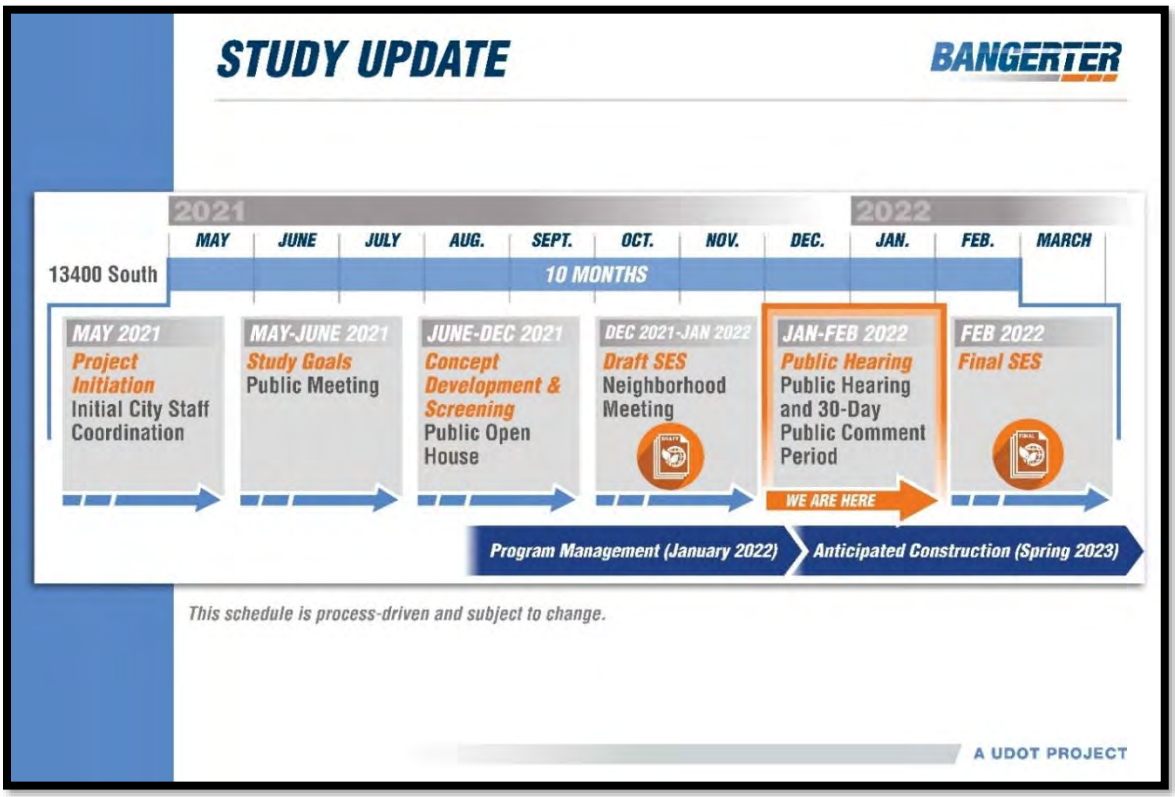
Enhance safety.



Improve travel times and increase mobility.

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BANGERTER INTERSECTIONS
BANGERTER
Phasing/Funding Prioritization
Complete
Environmental Study
Under Construction
• Indicates locations funded for future construction.
Currently Unfunded with no Anticipated Construction Date
Funding/Construction Anticipated for 2023
Funding/Construction Anticipated for 2028
2700 West
13400 South
9800 South
11400 South
12600 South
10400 South
9000 South
7800 South
7000 South
6200 South
5400 South
4700 South
4100 South
3500 South
3100 South
Parkway Blvd
2400 South
S.R. 201
1820 South
California Ave.
Redwood Road
600 West
154
15
215
201
N
Timelines for projects are subject to change based on funding.
A UDOT PROJECT

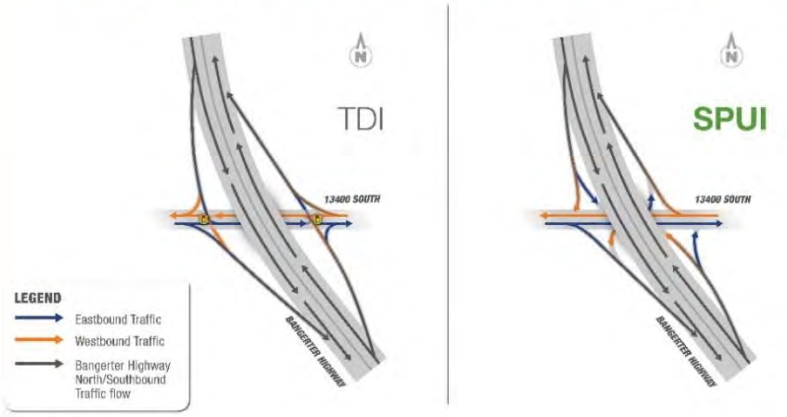

STUDY UPDATE
BANGERTER
2021
2022
MAY
JUNE
JULY
AUG.
SEPT.
OCT.
NOV.
DEC.
JAN.
FEB.
MARCH
13400 South
10 MONTHS
MAY 2021
Project Initiation
Initial City Staff Coordination
MAY-JUNE 2021
Study Goals
Public Meeting
JUNE-DEC 2021
Concept Development & Screening
Public Open House
DEC 2021-JAN 2022
Draft SES
Neighborhood Meeting
JAN-FEB 2022
Public Hearing
Public Hearing and 30-Day Public Comment Period
WE ARE HERE
FEB 2022
Final SES
Program Management (January 2022)
Anticipated Construction (Spring 2023)
This schedule is process-driven and subject to change.
A UDOT PROJECT

ALTERNATIVE SELECTION

BANGERTER

INTERCHANGE TYPES

- Tight Diamond Interchange (TDI)
- **Single Point Urban Interchange (SPUI)**



A UDOT PROJECT

ALTERNATIVE SELECTION

BANGERTER

HORIZONTAL ALIGNMENTS

- East Shift
- Center Widening
- **West Shift**



A UDOT PROJECT

VERTICAL ALIGNMENT OPTIONS

BANGERTER

Bangerter Over



~$99 Million

Bangerter Under



~$119 Million

Bangerter Hybrid



~$104 Million

All options will require the removal of the current pedestrian crossing over Bangerter Highway. Relocation of the structure is dependent on funding and not included in estimated costs.

A UDOT PROJECT

BANGERTER OVER

BANGERTER



Example: 7800 South in West Jordan

- Lowest cost
- No Riverton City contribution
- Minor utility impacts
- 18 impacted properties

A UDOT PROJECT

BANGERTER UNDER

BANGERTER



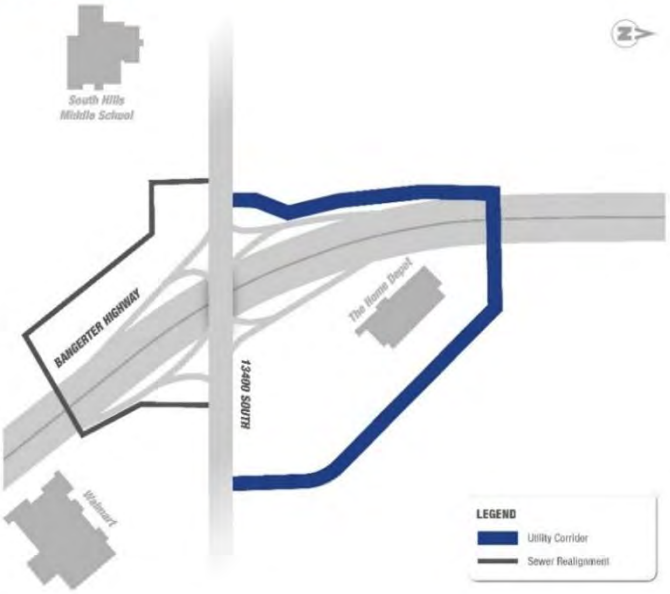
Example: 11400 South in South Jordan

- Highest cost
- Additional cost to go under: $22 million (split 50/50 by Riverton City and UDOT)
- Significant utility impacts and relocations
- 19 impacted properties

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BANGERTER UNDER
UTILITY RELOCATION

BANGERTER



A UDOT PROJECT

BANGERTER HYBRID

BANGERTER



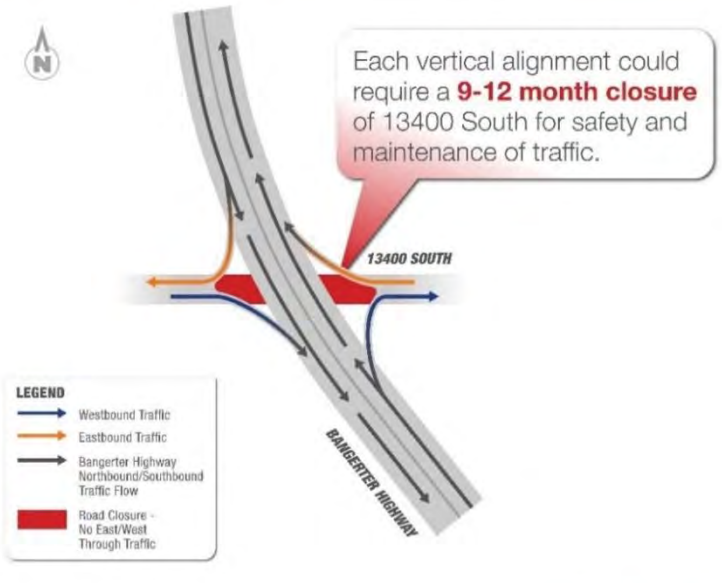
Example: 12600 South in Riverton

- Mid-range cost
- Additional cost for hybrid: $5 million (split 50/50 by Riverton City and UDOT)
- Some utility relocations
- Lower elevation than Bangerter Over
- 21 impacted properties

A UDOT PROJECT

CROSS-STREET CLOSURE

BANGERTER



A UDOT PROJECT

AFFECTED ENVIRONMENT AND MITIGATION COMMITMENTS

BANGERTER

Proposed Action Impacts	Mitigation
Right of Way	
• Partial ROW acquisition: **14 parcels** • Full ROW acquisition: **1 parcel** • Total area acquisitions: ***Over Option:*** **14.53 acres** ***Under Option:*** **19.43 acres** ***Hybrid Option:*** **15.59 acres**	Property owners will be compensated according to the requirements of the Utah Relocation Assistance Act.
Noise	
Over Option • Average **5 dBA** noise level increase • **78 of the 168 receptors** would exceed noise-abatement criteria • No receptors exhibit noise levels greater than 10 dBA above existing noise levels ***Under Option*** • Average **4 dBA** noise level increase • **65 of the 168 receptors** would exceed noise-abatement criteria • No receptors exhibit noise levels greater than 10 dBA above existing noise levels ***Hybrid Option*** • Average **4 dBA** noise level increase • **54 of the 168 receptors** would exceed noise-abatement criteria • No receptors exhibit noise levels greater than 10 dBA above existing noise levels	Future phase (2035 to 2050) build noise wall that meets UDOT's feasible and reasonable criteria. ***Over Option*** • **14-Foot Noise Wall** from approximately 13650 South to 13750 South for NB Bangerter (6-foot noise wall across bridge) pending future phase funding.* ***Under & Hybrid Options*** • **18-Foot Noise Wall** from approximately 13650 South to 13750 South for NB Bangerter (6-foot noise wall across bridge) pending future phase funding.* **Construction of this wall would occur only when funding is available for the extension of the northbound off-ramp and southbound-on ramp east of 3600 West and approved balloting.*
Construction	
• Delays and temporary east-west closures of 13400 South	UDOT 2022 Standard Specifications Compliance. Coordination with city and GPS services for alternate and detour routes.

A UDOT PROJECT

NOISE WALL

BANGERTER



Two noise walls were evaluated:

1. **East side of Bangerter from about 12900 S. to 13050 S.**
   a. Noise wall did not meet UDOT noise policy criteria and is not recommended.
   b. Existing privacy wall will be maintained.
2. **East side of Bangerter from about 13650 S. to 13750 S.**
   a. Noise wall met UDOT Noise Abatement Policy criteria and is recommended for balloting.
   b. Construction of this wall would occur only when funding is available for future phase work (anticipated in 2035 to 2050).

A UDOT PROJECT

RIGHT-OF-WAY ACQUISITION PROCESS

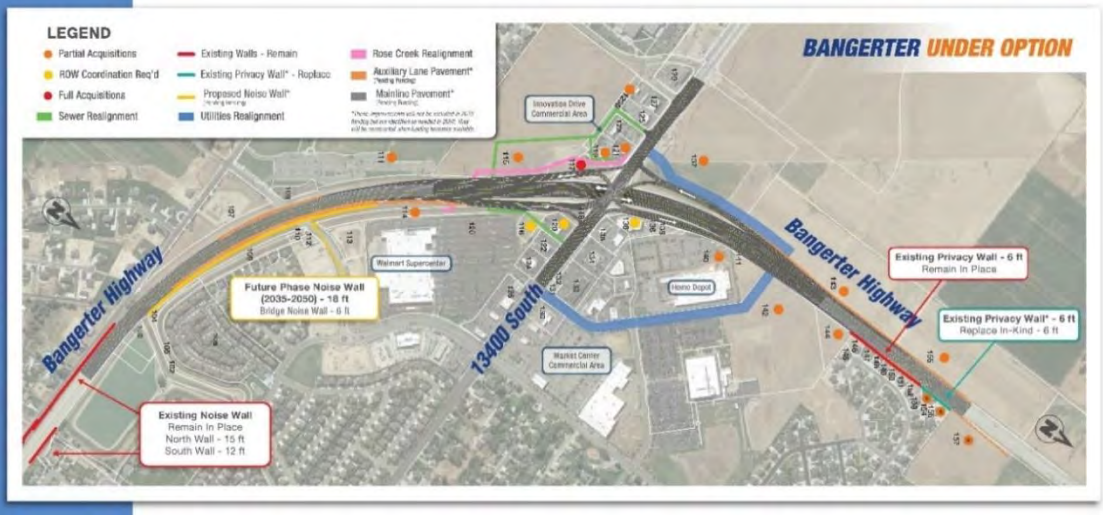
BANGERTER

1. **Identification** — The study team identifies what properties will be needed to construct the selected alternative.
2. **Contact** — Property owners will be contacted directly if their property is identified as a full or partial acquisition.
3. **Valuation** — Right-of-way (ROW) professionals will estimate the value of property.
4. **Acquisition** — ROW professionals will work closely with the property owner to acquire needed property at fair market value.

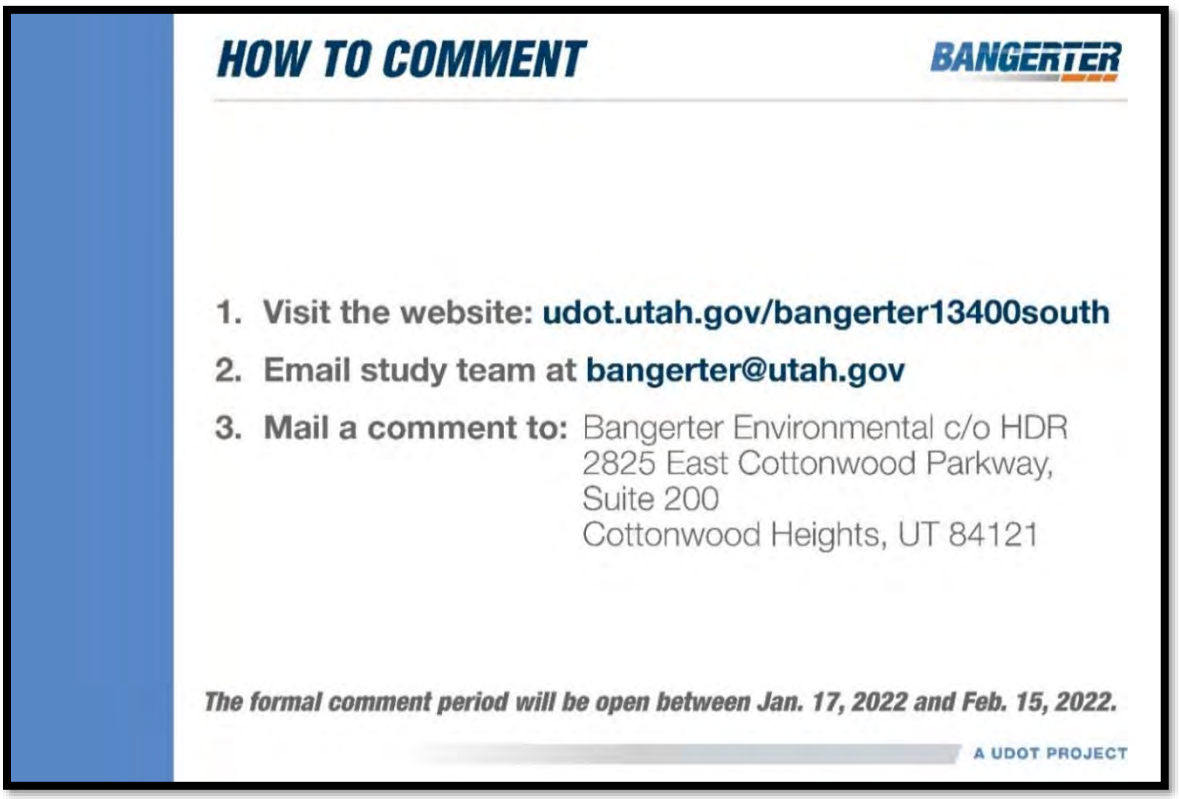
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SCROLL PLOTS

BANGERTER



A UDOT PROJECT

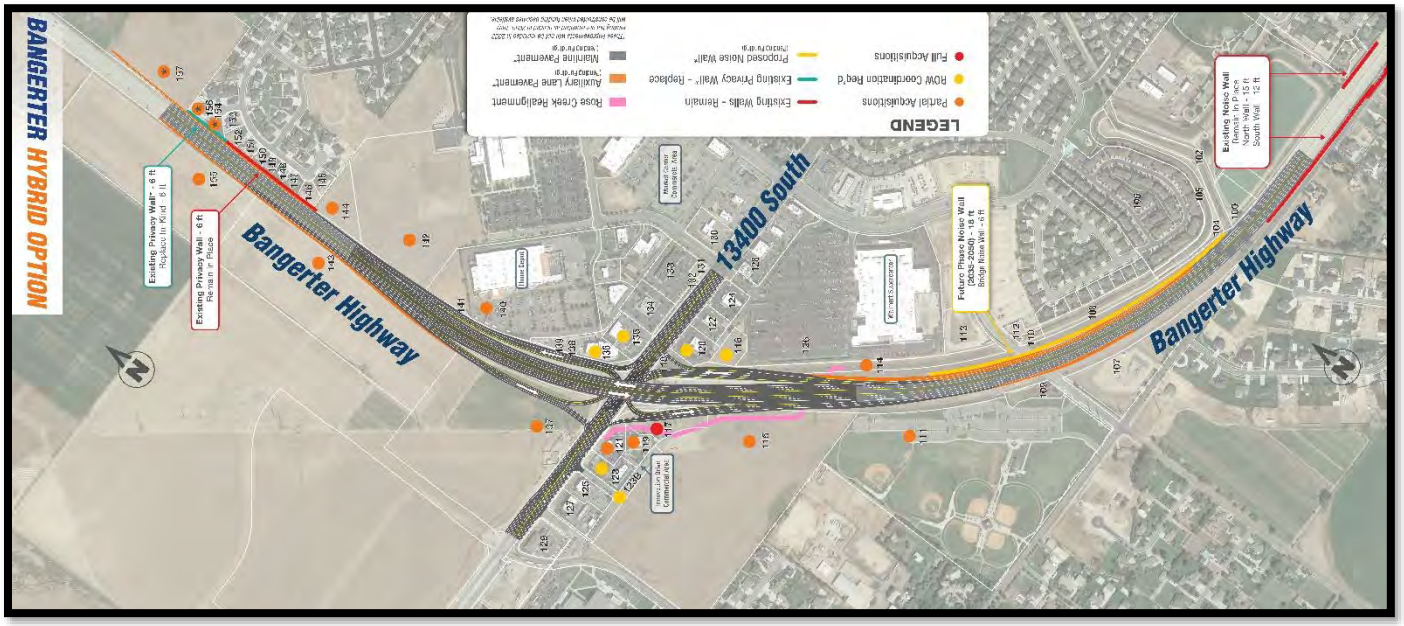

HOW TO COMMENT
BANGERTER
1. Visit the website: udot.utah.gov/bangerter13400south
2. Email study team at bangerter@utah.gov
3. Mail a comment to: Bangerter Environmental c/o HDR
2825 East Cottonwood Parkway,
Suite 200
Cottonwood Heights, UT 84121
The formal comment period will be open between Jan. 17, 2022 and Feb. 15, 2022.
A UDOT PROJECT


NEXT STEPS
BANGERTER
2021
2022
2023
DEC 2021
JAN-FEB 2022
FEB-MAR 2022
MAR 2022-SPRING 2023
Neighborhood Meeting
Release Draft SES
Public Comment Period
In-Person Public Hearing
Online Public Hearing
Release Final SES
Contractor Procurement
Public Notification of Design Selection
Construction Scheduled to Begin
ROW Process
This schedule is process-driven and subject to change.
A UDOT PROJECT

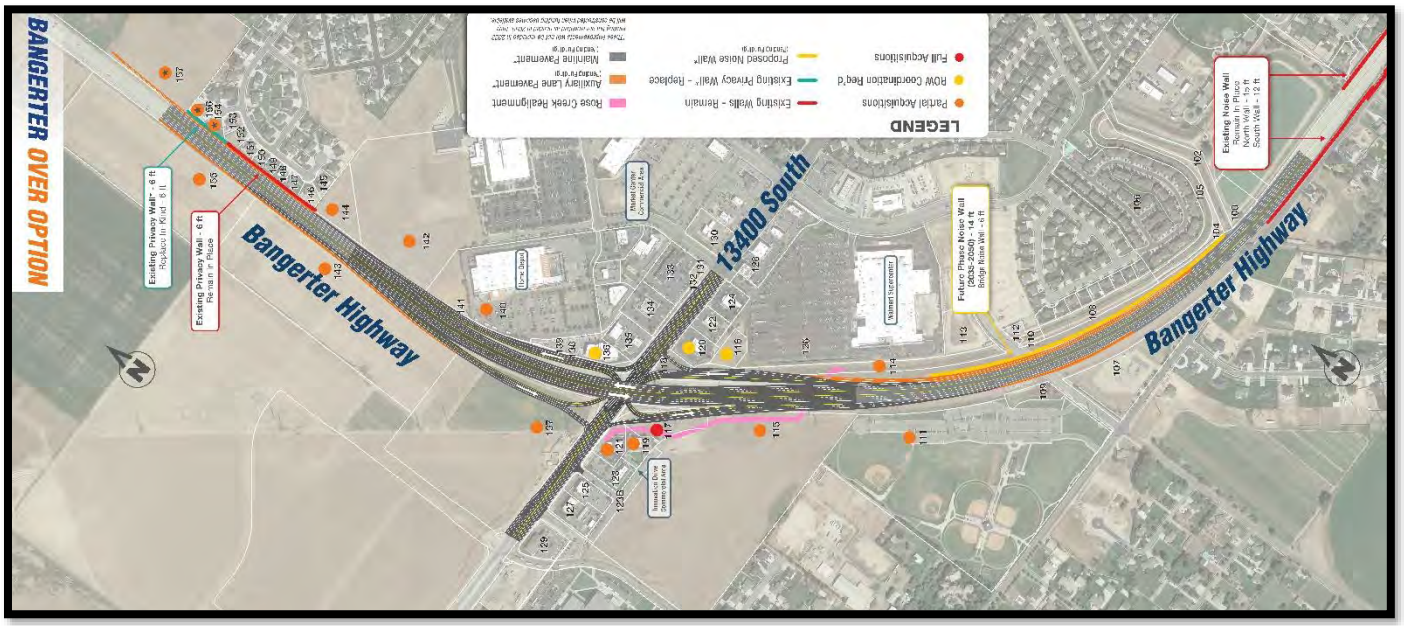

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Public Hearing Scroll Plots

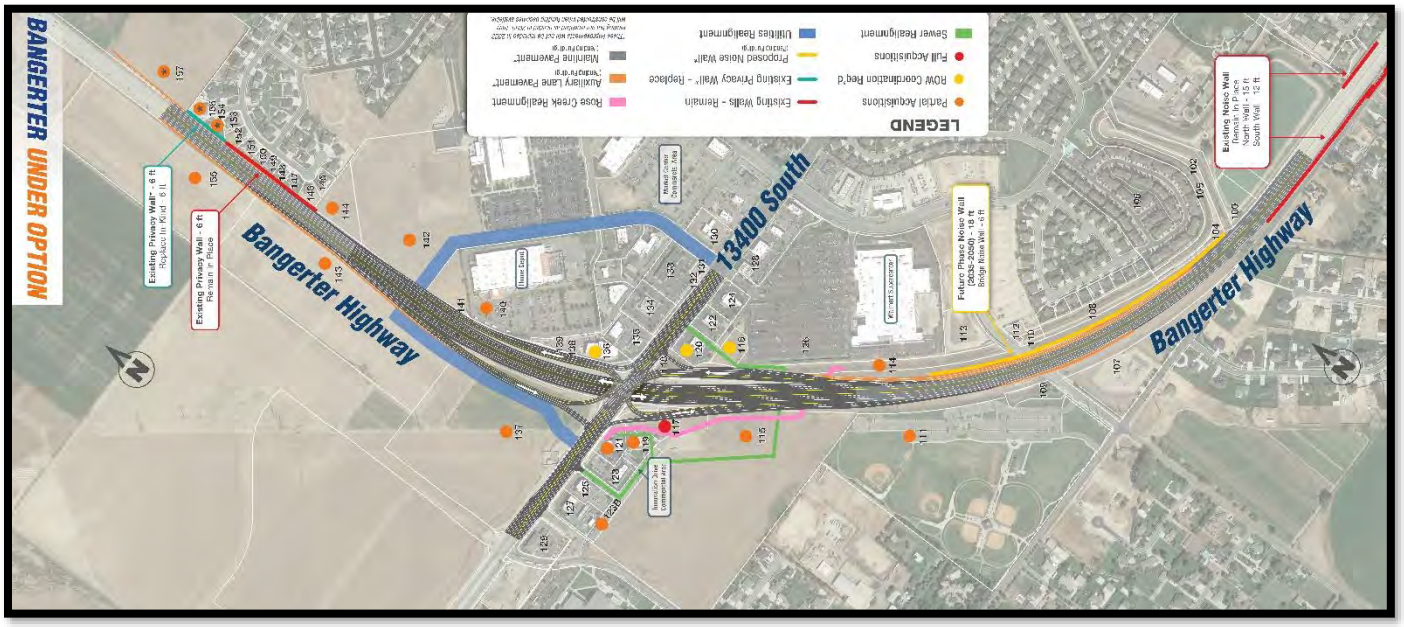
Hybrid Option



Over Option



Under Option



Appendix D Appendix D Public Comments

See next Page

RESPONSES TO PUBLIC COMMENTS RECEIVED DURING THE PUBLIC COMMENT PERIOD (1/17/2022 – 2/15/2022)
Project Name: Bangerter Highway at 13400 South Interchange Improvements
UDOT PIN: 18808; UDOT Project Number: S-0154(92)0

No.	Name (Comment Method)	Comment	Response
1.	No Name (Website)	There needs to be two dedicated lanes to exit 134th West onto Bangerter south, right turn only lanes. NOT, a partial second lane potentially blocked by traffic continuing east on Bangerter. There needs to be sufficient room on the 134th North exit as to not allow traffic to stack up onto Bangerter. Also, I prefer the Under design.	The traffic analysis shows that a grade-separated single-point urban interchange (SPUI) with three northbound left-turn lanes, one southbound left-turn lane, two eastbound left-turn lanes, one westbound left-turn lane, one northbound right-turn lane, two southbound right-turn lanes, one eastbound right-turn lane, and one westbound right-turn lane is needed to meet 2050 traffic demands at the intersection of Bangerter Highway and 13400 South. In addition, as a response to public and city comments, a second eastbound to southbound on-ramp lane was added to the design. This second southbound on-ramp lane will be accessed from an eastbound through/right-turn option lane. The decision regarding which grade-separated interchange is selected (over, under, or hybrid option) will be made at a later date based on funding and coordination with Riverton City. Once a decision is made, the Utah Department of Transportation (UDOT) will communicate this decision using various outreach channels.
2.	Jason Hutchison (Public Hearing, Written Comment)	The noise level at our house is almost unbearable. When we purchased 11 years ago, the noise wasn't that bad. Since you are making the HIGHWAY into a FREEWAY, the noise has gotten exponentially worse. And it's just going to get louder and louder. You should take responsibility for the noise and erect a sound wall. Waiting till 2035-2050 is not acceptable and is just a joke. I would sell my house and move but who will buy a house with a full freeway in the back yard. War are stuck and property values are going down. Again, take responsibility for what you are creating.	A noise study was conducted as part of the Bangerter Highway at 13400 South State Environmental Study to determine expected noise impacts from constructing a grade-separated interchange at the intersection at this location. The study found that one noise wall, from approximately 13650 South to 13750 South on the north and east sides of Bangerter Highway, would be both feasible and reasonable and would meet the requirements of UDOT's Noise Abatement Policy. This wall would be constructed only if funding is available for extending the northbound off-ramp and southbound on-ramp east of 3600 West and balloting is

No.	Name (Comment Method)	Comment	Response
			approved. See the Bangerter Highway at 13400 South Intersection Improvements Noise Study for more information.
3.	Andrew Tzvetcoff (Public Hearing, Written Comment)	Please construct it as it would be a considerable improvement to what is there now. As Mountain View Village continues to grow, please work with the City of Riverton with traffic lane closures on 134th (the city likes to allow lanes on 134th to be closed during morning commutes.). Also, be in close coordination with Jordan School District school dates and when in session, etc. The High School (Mountain View) draws a lot of traffic in the mornings. The same can be said for South Hills Middle School. My greatest concern is the gridlock with the 134th Bangerter Project, Mountainview Village construction, land between 134th and the high school, and land west of Bangerter and north of 134th all under construction at the same time. To me the city of Riverton is not sophisticated to deal with the traffic flow when all of this is going on. I have to go with the cheapest option with the Bangerter Highway over 134th. I am thankful UDOT is continuing with improving the flow of traffic on Bangerter with the interchange projects.	Coordination began early in the environmental process with Riverton City staff and the city council and the Jordan School District. Input from these meetings shaped the alternatives development process by identifying design preferences, resources to avoid, and acceptable mitigation for impacts. The project team will continue to coordinate with Riverton City and the Jordan School District as the project progresses. The decision regarding which grade-separated interchange is selected (over, under, or hybrid option) will be made at a later date based on funding and coordination with Riverton City. Once a decision is made, UDOT will communicate this decision using various outreach channels.
4.	Susie Cloward-Johnson (Public Hearing, Written Comment)	I am a resident of the Bluffdale neighborhood Palisade Acres on 13800 S. I am asking for a more accurate/comprehensive testing be done on noise levels and need for a sound wall. I do not trust the results of the current model and want it done from my actual front yard, not 1/2 mile away. There is	UDOT has developed a noise-abatement policy for transportation projects, which conforms to the Federal Highway Administration's (FHWA) noise-abatement requirements in 23 Code of Federal Regulations (CFR) Part 772.

No.	Name (Comment Method)	Comment	Response
		a partial sound wall on 13800 that was built before our neighborhood - it makes sense to continue it now that several homes have been built.	The Palisade Acres neighborhood was included in the noise study as part of the Bangerter Highway at 13400 South State Environmental Study. The five Palisades Acres homes nearest to Bangerter Highway were considered receptors in the noise study area (for more information, refer to receptors A-44 through A-48 in the Bangerter Highway at 13400 South Intersection Improvements Noise Study). The Palisades Acres homes located farther south of 13800 South were more than 500 feet from the project and were outside the noise study area. A sound-level meter was used to measure noise levels at six locations throughout the project area. Recorded measurements were used to validate the noise model. To be considered valid, the field noise measurements must be within 3 A-weighted decibels (dBA) of the model's predicted noise. As described in Section 3.3 of the noise study, the model validation results range between 0 and 3 dBA, so the noise model is considered valid. Existing noise levels were established via noise modeling for receptors located adjacent to, and approximately 500 feet from, Bangerter Highway and 13400 South. Existing traffic sound levels for receptors in this area were calculated with the FHWA Traffic Noise Model (TNM) version 2.5 software using existing conditions (travel lane configurations and level of service [LOS] C traffic volumes traveling at the posted speed limit). Projected traffic noise levels for the three project options were calculated with TNM version 2.5 software using the design of the three project options and LOS C traffic volumes traveling at the posted speed limit. To be consistent with UDOT's Noise Abatement Policy, LOS C traffic volumes were

No.	Name (Comment Method)	Comment	Response
			used to determine the greatest hourly traffic noise conditions that are likely to occur regularly. UDOT's Noise Abatement Policy states that a traffic noise impact occurs when either (1) the future worst-case noise level is equal to or greater than the UDOT noise-abatement criterion (NAC) for a specified land-use category or (2) the future worst-case noise level is greater than or equal to an increase of 10 dBA over the existing noise level. Neither the existing conditions or the modeled future noise levels at the Palisades Acres receptors were over the UDOT NAC levels, and none of modeled future noise levels were greater than or equal to an increase of 10 dBA over the existing noise levels (for more information, refer to receptors A-44 through A-48 in the Bangerter Highway at 13400 South Intersection Improvements Noise Study). For this reason, this neighborhood would not incur traffic noise impacts according to UDOT's noise-abatement policy. According to UDOT's noise-abatement policy, noise abatement will be considered and evaluated only in areas where traffic noise impacts are identified. Because there were no impacts in the Palisades Acres area, no noise-abatement measures were considered or evaluated. The existing noise wall on the south side of Bangerter Highway along 13800 South was constructed during the initial construction of Bangerter Highway in this location. There was no highway adjacent to those receptors before the construction of Bangerter Highway. As a result, those receptors experienced at least a 10-dBA increase in noise with the construction of Bangerter Highway and qualified for an evaluation of mitigation.

No.	Name (Comment Method)	Comment	Response
5.	Max Jenkins (Email)	I'm a citizen of Riverton. In the call tonight you mentioned that eventually the 134th S. intersection project will have a 3 left-turn lane but that it isn't part of the initial project. I would prefer that Riverton and ADOT strongly consider this as part of the initial project. It will cost the taxpayers much more to do years down the road and if we know it's inevitable I'd rather that we do it now. With how bad traffic currently is it would help alleviate the congestion as well. It would save us money in the long term.	The traffic analysis shows that a grade-separated single-point urban interchange (SPUI) with three northbound left-turn lanes, one southbound left-turn lane, two eastbound left-turn lanes, one westbound left-turn lane, one northbound right-turn lane, two southbound right-turn lanes, one eastbound right-turn lane, and one westbound right-turn lane is needed to meet 2050 traffic demands at the intersection of Bangerter Highway and 13400 South. In addition, as a response to public and city comments, a second eastbound to southbound on-ramp lane was added to the design. This second southbound on-ramp lane will be accessed from an eastbound through/right-turn option lane.
6.	Kim Colton (Website)	I feel we need to keep the up and down motion of Bangerter at a minimum. North bound on the curve it goes up, so to put Bangerter under 13400 S, would be roller coaster. Unless they are going back far enough to keep it even as possible.	The decision regarding which grade-separated interchange is selected (over, under, or hybrid option) will be made at a later date based on funding and coordination with Riverton City. Once a decision is made, UDOT will communicate this decision using various outreach channels.
7.	Scott Clarke (Website)	My concern is how long it is going to take. The intersection at 12600 and Bangerter is 6 months overdue and counting. The intersection is necessary but needs a much higher quality project team on it than 12600 has had.	Construction is anticipated to begin as early as 2023. The duration of construction will be determined once funding is finalized and a contractor is selected.
8.	David Spackman (Website)	I am for overpasses being constructed at all intersections of Bangerter Hwy. Please install at 3500 so and 4100 so. intersections	UDOT is currently conducting a State Environmental Study for the intersections at Bangerter Highway and 3500 South and at 4100 South.
9.	Darren Steck (Website)	My biggest input would be that it seems like this area is growing 100 fold every day and my concerns are is that or not considering the major growth is still going on out in here	The Wasatch Front Regional Council (WFRC)/Mountainland Associated of Governments (MAG) travel demand model was used to predict future travel and traffic volumes for the project area. In consultation with the region's Cities, WFRC

No.	Name (Comment Method)	Comment	Response
		and whether or not this intersection will be big enough to accommodate the growth that's happening	and MAG prepare future land use projections. These projections are used by WFRC to develop the *Wasatch Front Regional Transportation Plan* (RTP), which is the plan for the development of the area's future transportation system. The RTP includes a list of projects that are planned to meet future transportation needs over a horizon of 30+ years. Although WFRC coordinates with local jurisdictions in preparation of the land use projections, some adjustments were made to the 2050 projections for the Bangerter Highway at 13400 South traffic model to account for the latest approved plans for Olympia Hills and Daybreak and to reflect additional households and employment beyond what had been assumed in the RTP.
10.	David Douglas (Email)	The triple lane off ramp is needed now, not in 2050 as there is too much traffic now exiting north to west bound. It takes 90 seconds to get the present traffic through that intersection already during rush hour. This is a present, not future need. I have watched this intersection for 17 years and it has never been designed to sustain present, let alone future needs. Why spend all this money when it will not get all traffic through an intersection in one timing cycle? 13400 S traveling west bound has never been able to get all the needed traffic through one timing cycle, it needs 3 straight lanes to come close to getting traffic through. The right turn 13400 S going East to Bangerter South needs 2 dedicated lanes to get traffic through. If not, traffic backs up at 4000 W up to ½ a mile in the the morning, even with a second lane allowing partial access. The design did not a 2 lane option. Will there be 2 lanes built?	The traffic analysis shows that a grade-separated single-point urban interchange (SPUI) with three northbound left-turn lanes, one southbound left-turn lane, two eastbound left-turn lanes, one westbound left-turn lane, one northbound right-turn lane, two southbound right-turn lanes, one eastbound right-turn lane, and one westbound right-turn lane is needed to meet 2050 traffic demands at the intersection of Bangerter Highway and 13400 South. In addition, as a response to public and city comments, a second eastbound to southbound on-ramp lane was added to the design. This second southbound on-ramp lane will be accessed from an eastbound through/right-turn option lane. Operations at the Bangerter and 13400 South intersections are expected to improve with the interchange because through traffic on Bangerter Highway would be grade-separated and would not need to go through the signalized intersection.

No.	Name (Comment Method)	Comment	Response
		The left hand turn at 13400 S east to north is also not able to get all the traffic through in one cycle, so how is there enough time to get all traffic all the directions in one cycle when very little is changed even after the bridge is built?	
11.	Ray Brannen (Email)	To whom it may concern, Thank you for requesting input on the proposed interchanges on the Bangerter highway. I am providing input specific to the 134th interchange, and more specifically to the exits and areas immediately to the west of the highway leading toward Herriman. I live in Herriman, so I am very familiar with this interchange. Additionally, as a former resident of the Phoenix metro area in Arizona, I witnessed the incredible growth of my city in Glendale, and ironically, lived near a freeway interchange, also on a curve, and one that was the primary feeder route to the northwest section of the Phoenix metro area. With mountains, riverbeds and other obstacles, the area had similar challenges to the southwest Salt Lake metro area. The freeway and exits in Glendale had to undergo additional changes to accommodate the traffic during rush hour that backed up onto the highway only a few years after the initial design was constructed. If interested, please look at the Loop 101 freeway and the 75th avenue westbound exit for reference (partial photo at the end of this email for reference). I hope this information is helpful. Please feel free to call or email of you have any question on what I provided. I love all of the work that has been done on the Bangerter highway and look forward to the future changes.	Your comment has been recognized.

No.	Name (Comment Method)	Comment	Response
		Regards, Ray Brannen *See comment #11, Attachments 1, 2, and 3 at the end of this document for illustrations.*	
12.	Chris Timms (Website)	Please make this happen. The light's congestion at 13400th is so bad at times, we plan an extra 20 minutes to get through it. This would make the road a much better and fast route.	Your comment has been recognized.
13.	Jon Gilchrest (Website)	It appears that the Existing Condition evaluated in the Traffic Report assumes a signalized intersection at 12600 South and Bangerter. Is this accurate? The existing condition should probably be considered as a SPUI, since that is what is being studied--the additional interchange on Bangerter	This is correct; the existing conditions traffic analysis assumes the intersection at Bangerter Highway at 12600 South to be a signalized intersection because that is the condition for which traffic volume data were available. However, 2050 (build) traffic analysis considers the intersection at Bangerter Highway at 12600 South to be a grade-separated interchange. For additional details, see the Bangerter Highway and 13400 South Existing and 2050 No-Build Traffic Analysis memo and the Bangerter Highway and 13400 South Future Build Traffic Analysis memo.
14.	Jon Gilchrest (Website)	The alternatives memo does not seem to include any potential impacts to the Kern River gas facility that crosses 13400 South in this area. This is the main natural gas pipeline between production basins in Wyoming all the way to Southern California. It seems like lowering 13400 South may cause impacts to this pipeline, which could be very expensive and potentially a fatal flaw. Have potential impacts to Kern River been accounted for in the analysis?	The project team has been coordinating with the Kern River Gas Transmission Company. Kern River has been added to the list of potentially impacted utilities for the Hybrid Option in Table 3 of the Bangerter Highway at 13400 South Alternatives Memo.

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15.	Daniel Reese (Website)	Put the freeway in. We need more north/south roads, especially on the west side.	Your comment has been recognized.
16.	Michael Fenn (Website)	This has been a long time coming & honestly cannot finished soon enough. Bangerter should have been converted to a freeway decades ago. The South end of the valley is way behind on proper roads to properly move the traffic that came with Herriman Cities over-population. Work needs to begin on the Mountain View Corridor to be a freeway too.	Your comment has been recognized.
17.	Jon Gilchrest (Website)	One of the assumptions in the 2050 No Build alternative is that 4000 West will be constructed as a four lane road between 12600 South and 13400 South. This road has already been completed and is open. Should this be included in the existing conditions as well?	For the purpose of the traffic analysis, "existing conditions" refers to the spring of 2021 when existing traffic volume data were obtained. These data were then adjusted to account for construction and COVID-19 conditions. Because the new 4000 West segment was not open in the spring of 2021, it was not included as part of the existing conditions.
18.	Amy Rose (Website)	Greetings, As impacted residents who live directly next to Bangerter in Bluffdale City (at approximately 3400 W. and 13800 S.), we have questions and concerns regarding the 13400 South project, based on the draft SES and information we obtained at the public hearing on January 19, 2022. - Why weren't actual sensors used to measure the current sound and for future sound projections in our area? - sound was measured right near our home, but sensors were not actually used - results were based on computer modeling from another location	UDOT has developed a noise-abatement policy for transportation projects, which conforms to the Federal Highway Administration's (FHWA) noise-abatement requirements in 23 Code of Federal Regulations (CFR) Part 772. The Palisade Acres neighborhood was included in the noise study as part of the Bangerter Highway at 13400 South State Environmental Study. The five Palisades Acres homes nearest to Bangerter Highway were considered receptors in the noise study area (for more information, refer to receptors A-44 through A-48 in the Bangerter Highway at 13400 South Intersection Improvements Noise Study). The Palisades Acres homes located farther south of 13800 South were more than

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		- the other location is not a residential area like ours, and Bangerter does not have the same curve nor the same slope in that other location - based on the computer models, there is a current decibel level of 61 and a projected decibel level of 65 (only 1 decibel shy of the 66 required to justify a sound wall) - UDOT is ignoring the actual current noise and projected noise in our area by only using flawed computer modeling - How can we request study of our area with actual sensors rather than flawed computer modeling? - we already experience a massive impact from traffic sound and lights in our neighborhood - at the least, we deserve accurate results of both the current and projected sound levels - in fact, directly across from us at the exact same location on Bangerter, a sound wall was found to be justified - What is our recourse if the actual sound levels increase beyond the projected sound levels? - the sound wall that will be built directly across from us on Bangerter will reflect even more sound right at us - we were told this impact was not considered at all - we were also informed that UDOT does not at any point intend to measure the impact of the sound reflection off the new wall - UDOT is essentially bringing a nuisance into our area by building the wall on the opposite side of Bangerter but not on our side, and then walking away leaving us with no recourse	500 feet from the project and were outside the noise study area. A sound-level meter was used to measure noise levels at six locations throughout the project area. Recorded measurements were used to validate the noise model. To be considered valid, the field noise measurements must be within 3 A-weighted decibels (dBA) of the model's predicted noise. As described in Section 3.3 of the noise study, the model validation results range between 0 and 3 dBA, so the noise model is considered valid. Existing noise levels were established via noise modeling for receptors located adjacent to, and approximately 500 feet from, Bangerter Highway and 13400 South. Existing traffic sound levels for receptors in this area were calculated with the FHWA Traffic Noise Model (TNM) version 2.5 software using existing conditions (travel lane configurations and level of service [LOS] C traffic volumes traveling at the posted speed limit). Projected traffic noise levels for the three project options were calculated with TNM version 2.5 software using the design of the three project options and LOS C traffic volumes traveling at the posted speed limit. To be consistent with UDOT's Noise Abatement Policy, LOS C traffic volumes were used to determine the greatest hourly traffic noise conditions that are likely to occur regularly. UDOT's Noise Abatement Policy states that a traffic noise impact occurs when either (1) the future worst-case noise level is equal to or greater than the UDOT noise-abatement criterion (NAC) for a specified land-use category or (2) the

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		- How do we request a sound "true up" in the future (to see whether projected decibel levels turn out to be accurate)? - we were informed at the hearing that there is no way to request that - we were also told that UDOT would not itself perform such a measurement - noise will increase significantly with westward expansion and, as a UDOT official specifically highlighted, inevitable diversion of traffic from I-80 and I-215 onto Bangerter once it is a full freeway - again, UDOT leaves us with inaccurate and incomplete information, and no recourse - How could even the current sound level not justify a sound wall? - we are aware UDOT has criteria for building sound walls, and respect the need for those criteria - yet, if an accurate study is done, a wall should be justified - how could it not be, if the sound and impact were accurately measured? There is an existing wall right next to where we need our wall - that existing wall was found to be justified previously, when there were far fewer homes and far less traffic noise - Is light pollution ever considered? - we have both direct or reflected headlights shine directly into our bedrooms - If funding came from elsewhere, would UDOT consider a sound wall?	future worst-case noise level is greater than or equal to an increase of 10 dBA over the existing noise level. Neither the existing conditions or the modeled future noise levels at the Palisades Acres receptors were over the UDOT NAC levels, and none of modeled future noise levels were greater than or equal to an increase of 10 dBA over the existing noise levels (for more information, refer to receptors A-44 through A-48 in the Bangerter Highway at 13400 South Intersection Improvements Noise Study). For this reason, this neighborhood would not incur traffic noise impacts according to UDOT's noise-abatement policy. According to UDOT's noise-abatement policy, noise abatement will be considered and evaluated only in areas where traffic noise impacts are identified. Because there were no impacts in the Palisades Acres area, no noise-abatement measures were considered or evaluated. Noise walls were evaluated on the north side of Bangerter Highway from approximately 13650 South to 13750 South because there were modeled impacts in this location where the homes are closer to Bangerter Highway. "Actual" sound levels vary all the time. For example, using a short-term event like a motorcycle or ambulance passing by for the baseline data would not be representative of more common conditions. The noise analysis is intended to capture conservative (meaning probably louder than normal) noise conditions (LOS C traffic volumes in both directions at the same time). UDOT has to use these modeled noise levels to consistently evaluate noise impacts and noise walls for all of their projects.

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		- as an example, if Bluffdale City were able to obtain funding and approach UDOT about a right-of-way, would UDOT let Bluffdale City build a wall? - if so, would that have to be connected to a UDOT project in the area, or could that be requested at any time? - cost of the sound wall on the opposite side is about $775,000 (negligible in comparison to the cost of the full 13400 South project) - Why wasn't the Bluffdale City Council or a representative from Bluffdale City Engineering specifically invited to attend, as was apparently done for Riverton City? - What about the option of placing road signs, like "No Engine Brakes" signs? - or, what about decreasing the truck speed limit on the curve to try to minimize their use of engine brakes? - engine brakes are a big problem for us; at least 15-20 times a day (often as early as the 5:00 and 6:00 am hours) big trucks go around the curve and use their engine brakes Thank you for your consideration. We look forward to receiving responses to our questions and concerns.	As discussed in the FHWA Traffic Noise Analysis and Abatement Policy and Guidance, highway traffic noise levels are not substantially increased by construction of a noise barrier on the opposite side of a highway from a receiver. If both the direct noise levels and the reflected noise levels are not abated by natural or artificial terrain features, the noise increase is theoretically limited to 3 dBA due to a doubling of energy from the noise source. In practice, however, not all of the acoustical energy is reflected back to the receiver. Some of the energy is diffracted over the barrier, some is reflected to points other than the receiver, some is scattered by ground coverings (for example, grass and shrubs), and some is blocked by the vehicles on the highway. Additionally, some of the reflected energy to the receiver is lost due to the longer path that it must travel. Attempts to conclusively measure this reflective increase have never shown an increase of greater than 1to 2 dBA, an increase that is not perceptible to most people. There is currently no UDOT process for requesting future noise readings to be conducted after a project is constructed. The intent of noise measurements is not to determine existing or future noise levels. Noise measurements taken in the field are used to validate the noise model, which is built to analyze future noise produced by traffic volumes and geometric conditions. The noise model for the project assumes three lanes of traffic at LOS C in both directions, which is considered the worst-case noise condition. The existing noise wall on the south side of Bangerter Highway along 13800 South was constructed during the initial construction of Bangerter Highway in this location. There was no highway adjacent to those receptors before

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			the construction of Bangerter Highway. As a result, those receptors experienced at least a 10-dBA increase in noise with the construction of Bangerter Highway and qualified for an evaluation of mitigation. UDOT is allowed by the noise-abatement policy to construct and maintain noise-abatement measures along state highway right of way in cases where citizens, owners of adjacent property, developers, or local municipalities provide the cost for the noise abatement, and the abatement meets the other feasible and reasonable criteria. UDOT will design, build, and maintain the abatement measure, and the local municipality acting for and on behalf of other groups will pay UDOT for all preliminary engineering, construction, and maintenance costs. A third party, such as a local municipality, is allowed to contribute funds to make functional or aesthetic enhancements to a noise-abatement feature in instances where noise abatement has already been deemed feasible and reasonable. The Palisades Acres receptors do not meet the future noise level impact threshold and do not qualify for noise mitigation. Light from vehicles on Bangerter Highway would not change in the areas near the Palisade Acres neighborhood with or without the proposed project. Adding engine brake restrictions and signs would require following UDOT policies 06C-24, Engine Brake Restriction Signing, and 06C-05, Establishment of Speed Limits on State Highways, which require that a request first be made by the applicable local government, in response to which UDOT studies the safety implications of the proposed restriction. If the restriction can be safely implemented, UDOT installs

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			appropriate signs. Enforcing any engine brake restrictions is the responsibility of local law enforcement, not UDOT. The Bluffdale city engineer and city manager were sent an email notification regarding the public hearing. In addition, the project team has met regularly with Bluffdale City while planning for the project.
19.	Michael Bergdorf (Website)	The timing of this survey is suspect due to ongoing construction at the Bangerter and 12600 interchange. People are using 13400 and 11400 as detour exits while 12600 is either non-functional or severely limited. Long-term data is still valid, but I'm suspicious of today's information on 13400's efficiency. I think a second survey after Bangerter and 12600's completion would be worthwhile, to see how the completed hybrid option affects the traffic detouring through 13400.	Current construction at the Bangerter Highway and 12600 South interchange would not affect the traffic study for Bangerter Highway at 13400 South. The travel demand model has two primary inputs: land use data and transportation system data. The land use data consists of residential and employment data for the entire region. The travel model inputs are prepared for a base year, which in this case was 2019, and for a future year, which in this case was 2050. A base year of 2019 was used because both travel model socioeconomic inputs and published traffic volume data are available for that year. In travel modeling, the base year always lags the current year by a few years because of the need to have land use input and calibration data. To validate the model for the study area, base-year model traffic volumes were compared to published traffic volumes. Free-flow speeds on some roads in the study area were adjusted to bring the model traffic volumes closer to the observed volumes. For model validation, traffic counts from UDOT's Traffic on Utah Highways were used. These counts provide annual average daily traffic (AADT) on state highways and federal-aid roads. These AADTs were used to estimate average weekday daily traffic (AWDT) traffic for

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			comparison to the travel model output using statewide traffic factors provided to UDOT. For additional details, see the Bangerter Highway and 13400 South Existing and 2050 No-Build Traffic Analysis and the Bangerter Highway and 13400 South Future Build Traffic Analysis.
20.	Brad Jensen (Website)	I feel separated crossings of Bangerter Hwy, without any connections, such as 11800 South, are very beneficial to the local east/west traffic flow, especially in existing and proposed commercial areas. I feel it would be very beneficial to create such a crossing a few blocks north of 13200 South, connecting Magestic Rise Pkwy to Market Ctr. Dr. While I understand that this crossing is not included in this project scope, I would suggest that the options for the 13200 South interchange, consider what would best accommodate such a future crossing. Thank you.	3600 West is an existing crossing without a connection to Bangerter Highway that will be maintained with the 13400 South interchange project. A grade-separated crossing at 13200 South is not currently listed in the Wasatch Front Regional Council's *Wasatch Front Regional Transportation Plan*.
21.	Jared Williams (Website)	I prefer the Bangerter under option Under saves the beautiful views where an overpass like 9000 South ruins them	The decision regarding which grade-separated interchange is selected (over, under, or hybrid option) will be made at a later date based on funding and coordination with Riverton City. Once a decision is made, UDOT will communicate this decision using various outreach channels.
22.	Gary Griffiths (Website)	Concern over traffic flow during construction. Westbound 13400 south traffic will use the intersection of bangerter and 2700 West and will route along the west side of bangerter using 13800 south to 4000 west then north to return to 13400 south. That route cannot accommodate an increase in traffic load. Planning needs to happen now to address that now.	Specific detours and closures are not known at this time. Traffic delay is modeled by the traffic engineers, and lane requirements are given to the contractor to maintain during construction.

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		During the construction closure of 12600 south and due to the resulting increase in traffic at the intersection of 13400 south and bangerter, a high number of vehicles utilized the 2700 west and bangerter intersection to route west along bangerter using 13800 south to 4000 west then north to return to 13400 south causing increase traffic and backing at the intersection back to the school. The traffic will be much worse during a closure of the 13400 intersection.	
23.	David Douglas (Email)	Hello UDOT planners for 13400 S and Bangerter interchange, I was involved in the recent meeting regarding the construction of the interchange at 13400 S. and Bangerter. I noticed one significant design issue with the interchange. Presently there is a dedicated right-turn lane traveling east on 13400 S to Bangerter southbound. The middle lane is also used to turn right. This allows traffic traveling east prior to the 4000 W intersection to utilize both lanes to pass through the intersection when green and then turn right. Presently, one third of the traffic uses the center lane as they pass through 4000 W traveling east to eventually turn right to enter Bangerter south. EVEN WITH THIS OPTION of using the center lane to turn right, traffic must, of course, stop at 4000 W when the light turns red going east/west. I have watched over and over traffic in the right lane back up so much they could not make the light in 1 timing cycle during the commute. It must be noted, 1/3 of the traffic also uses the center lane to turn right. Switching to a design where the center lane cannot turn right, the right lane will likely back up a mile or more prior to the light signal at 4000 W, during the commute and likely during mid day. I remember having to wait 10-15 minutes to	The traffic analysis shows that a grade-separated single-point urban interchange (SPUI) with three northbound left-turn lanes, one southbound left-turn lane, two eastbound left-turn lanes, one westbound left-turn lane, one northbound right-turn lane, two southbound right-turn lanes, one eastbound right-turn lane, and one westbound right-turn lane is needed to meet 2050 traffic demands at the intersection of Bangerter Highway and 13400 South. The traffic analysis also showed the need for two eastbound and two westbound through lanes on 13400 South. In addition, as a response to public and city comments, a second eastbound to southbound on-ramp lane was added to the design. This second southbound on-ramp lane will be accessed from an eastbound through/right-turn option lane.

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		get through that light back when it was a single lane road, and I can see that happening again unless the center lane can be used to turn right and go straight as it does now. I have a video of it. Without the center lane access, this WILL cause a log jam. I guarantee it. Presently, if the light is red at 13400 S and Bangerter going east, IF there are more than 3 cars going straight in the (center)right lane, just prior to the light, they have to stop until the light turns green. This blocks the center lane causing the traffic turning right to come to a halt. This again causes a backup. I have a simple proposal, which can be funded easily by choosing the least expensive full interchange future design. I believe the estimation of cost for the least expensive design would be 20 million dollars less than the most expensive design. Some of the saving can be used by expanding the right hand on ramp from 13400 S east to Bangerter south as designed in the "recommended design" page I am submitting (*see Comment #23, Attachments 1, 2, and 3 at the end of this document for illustrations*). This will allow the center lane to still be utilized to turn right, WHILE NOT BOTTLENECKING the right lane west of 4000 W. I am submitting this modified design for your view and I believe it would satisfy the argument made by the designers at the meeting. They stated having 2 dedicated right hand turn lanes just after 4000 W would cause a bottleneck at 4000 W because all traffic would need to move to the right lane prior to 4000 W causing a bottleneck east of the light. Please take this into consideration. I have fought traffic issues on this road for 17 years with little relief.	

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		Thanks, David Douglas	
24.	David Clegg (Email)	I am a resident of Palisade Acres in Bluffdale and have lived here since 2016. There has been a steady increase in noise pollution over the past few years. Unless there is a strong wind out of the south, the noise of Bangerter Highway is constant and relentless. It isn't uncommon to have our children wake up at night to the sound of engine brakes from a semi truck or someone street racing. This is a problem that will only get worse as the area and population continues to grow. We desperately need a sound wall to protect our community. I strongly urge you to reconsider your plans to leave the south side of Bangerter open. Thank you for your time.	UDOT has developed a noise-abatement policy for transportation projects, which conforms to the Federal Highway Administration's (FHWA) noise-abatement requirements in 23 Code of Federal Regulations (CFR) Part 772. The Palisade Acres neighborhood was included in the noise study as part of the Bangerter Highway at 13400 South State Environmental Study. The five Palisades Acres homes nearest to Bangerter Highway were considered receptors in the noise study area (for more information, refer to receptors A-44 through A-48 in the Bangerter Highway at 13400 South Intersection Improvements Noise Study). The Palisades Acres homes located farther south of 13800 South were more than 500 feet from the project and were outside the noise study area. A sound-level meter was used to measure noise levels at six locations throughout the project area. Recorded measurements were used to validate the noise model. To be considered valid, the field noise measurements must be within 3 A-weighted decibels (dBA) of the model's predicted noise. As described in Section 3.3 of the noise study, the model validation results range between 0 and 3 dBA, so the noise model is considered valid. Existing noise levels were established via noise modeling for receptors located adjacent to, and approximately 500 feet from, Bangerter Highway and 13400 South. Existing traffic sound levels for receptors in this area were calculated with

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			the FHWA Traffic Noise Model (TNM) version 2.5 software using existing conditions (travel lane configurations and level of service [LOS] C traffic volumes traveling at the posted speed limit). Projected traffic noise levels for the three project options were calculated with TNM version 2.5 software using the design of the three project options and LOS C traffic volumes traveling at the posted speed limit. To be consistent with UDOT's Noise Abatement Policy, LOS C traffic volumes were used to determine the greatest hourly traffic noise conditions that are likely to occur regularly. UDOT's Noise Abatement Policy states that a traffic noise impact occurs when either (1) the future worst-case noise level is equal to or greater than the UDOT noise-abatement criterion (NAC) for a specified land-use category or (2) the future worst-case noise level is greater than or equal to an increase of 10 dBA over the existing noise level. Neither the existing conditions or the modeled future noise levels at the Palisades Acres receptors were over the UDOT NAC levels, and none of modeled future noise levels were greater than or equal to an increase of 10 dBA over the existing noise levels (for more information, refer to receptors A-44 through A-48 in the Bangerter Highway at 13400 South Intersection Improvements Noise Study). For this reason, this neighborhood would not incur traffic noise impacts according to UDOT's noise-abatement policy. According to UDOT's noise-abatement policy, noise abatement will be considered and evaluated only in areas where traffic noise impacts are identified. Because there

No.	Name (Comment Method)	Comment	Response
			were no impacts in the Palisades Acres area, no noise-abatement measures were considered or evaluated.
25.	Rebecca Condie (Website)	My concern is with detours during construction. My neighborhood is worried traffic will use 13800 S and 4000 W as a detour route and make roads so congested that it will be difficult to get in and out of our homes to the main roads. In the past when there have been accidents blocking Bangerter, traffic has done that and been backed up clear to 3600 W and 2700 W, taking 30 min or more to get to 13400 S. I know it will be difficult to enforce, but if possible please don't let people use the neighborhood roads as a detour. It would be better if the westbound detour took traffic north to 12600 S and then west.	Specific detours and closures are not known at this time. Traffic delay is modeled by the traffic engineers, and lane requirements are given to the contractor to maintain during construction.
26.	Rebecca Condie (Website)	I would like to make sure that 3600 W where it underpasses Bangerter will still be open and available during construction.	The existing bridge over 3600 West would not be reconstructed or widened as part of the first phase of the project, so that access would not need to be closed. Temporary nightly lane closures might be needed to complete work in the area, but 3600 West is currently anticipated to remain open during the entire project.
27.	William Silvester (Public Hearing, Verbal Comment)	Two comments: We moved up from -- down in Riverton 20 years ago, so we have lived in our current house at 35th West and 133rd, so it is just through the intersection. And in that two years, Bangerter and 134th has been under some type of construction or rebuild for ten of those 20 years. My grandson-in-law worked as an inspector when they were doing that work there. He was working for an engineering firm that was inspecting the work, and they told him six years ago that all the stuff that they done to do that building	Your comment has been recognized. The decision regarding which grade-separated interchange is selected (over, under, or hybrid option) will be made at a later date based on funding and coordination with Riverton City. Once a decision is made, UDOT will communicate this decision using various outreach channels.

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		was going to be ripped out and it would go away. And I thought: What a terrible waste of money. Is there any way that we can get the road lower so the sides come up to dampen this sound? I can hear the roadway clear over at 133rd South and 35th West. I can hear the noise from Bangerter Highway every minute. It's something you get used to, but there is noise there. But anyway, anything that would put it below grade would make me happy. And especially when they think about -- I was talking to one guy. He said, "Oh, that is a long way in the future." And I said -- I was talking about the Mountain View Corridor. I said, "You know, that should be dug out right now, and they should put that down through there." I said, "They could utilize all of that gravel, all that dirt and everything, to do whatever they needed to, with all of that rock and stuff that they take out below." And then I said, "You can put the road down below. It can go under every overpass." But who am I?· Just an old man.	
28.	Ron Marchant (Public Hearing, Verbal Comment)	So I'm a resident in the Palisade Acres Subdivision. The address is [redacted], and my comments are related to sound walls. The Palisade Acres Subdivision is south of Bangerter, and right now, there is not even a proposed sound wall to go in that area. As I was talking to the group at the open house that had information about sound, they showed us the report, they mentioned that sound was sampled in other locations, although it wasn't sampled by our neighborhood. They did indicate that it was modeled, and the modeling shows that -- I think it's one decibel. If you look at the proposed sound two years out, it's one decibel short of the	UDOT has developed a noise-abatement policy for transportation projects, which conforms to the Federal Highway Administration's (FHWA) noise-abatement requirements in 23 Code of Federal Regulations (CFR) Part 772. The Palisade Acres neighborhood was included in the noise study as part of the Bangerter Highway at 13400 South State Environmental Study. The five Palisades Acres homes nearest to Bangerter Highway were considered receptors in the noise study area (for more information, refer to receptors A-44 through A-48 in the Bangerter Highway at 13400 South Intersection Improvements Noise Study). The Palisades Acres

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		threshold of looking at sound walls. And my concern is that there's not a sound wall proposed. At the very least, what I want is to have a sound wall proposed in front of that Palisade Acres Subdivision in the same way that it's proposed on the other side of Bangerter. I would suggest that if a sound wall isn't built, but it is on the other side, then the sound is going to, you know, amplify off of that other wall and cause a sound to increase, you know, over that threshold. When I talked to the engineer about that, you know, he said that that's not always the case, but that, you know, doesn't pass the gut check to me. It seems obvious that if you have a wall on one side of a highway and not on the other, that it's going to cause the noise to be louder on the side without the wall. That seems very obvious to me. The other thing that doesn't pass the gut check to me is most of that road on -- along Bangerter Highway, just east of our house, east of the neighborhood, has a sound wall, but it stops. And the reason why it stops is because there wasn't a development at the time that that prior sound wall was built. It was farmland area. But now there is a residence there, and so it seems very clear to me that if there was enough justification to build the sound wall previously, there should be enough to extend that, now the neighborhood is there. And it is my understanding that if it is going to happen, it needs to be part of this project. So what I would request is that, at the very least, it be proposed -- listed in yellow on the maps and proposed in the same way that it is on the other side of the freeway."	homes located farther south of 13800 South were more than 500 feet from the project and were outside the noise study area. A sound-level meter was used to measure noise levels at six locations throughout the project area. Recorded measurements were used to validate the noise model. To be considered valid, the field noise measurements must be within 3 A-weighted decibels (dBA) of the model's predicted noise. As described in Section 3.3 of the noise study, the model validation results range between 0 and 3 dBA, so the noise model is considered valid. Existing noise levels were established via noise modeling for receptors located adjacent to, and approximately 500 feet from, Bangerter Highway and 13400 South. Existing traffic sound levels for receptors in this area were calculated with the FHWA Traffic Noise Model (TNM) version 2.5 software using existing conditions (travel lane configurations and level of service [LOS] C traffic volumes traveling at the posted speed limit). Projected traffic noise levels for the three project options were calculated with TNM version 2.5 software using the design of the three project options and LOS C traffic volumes traveling at the posted speed limit. To be consistent with UDOT's Noise Abatement Policy, LOS C traffic volumes were used to determine the greatest hourly traffic noise conditions that are likely to occur regularly. Specific location noise monitoring is not necessary in order to model noise at each receptor. UDOT could take additional measurements, but these would be unlikely to change the modeled noise levels.

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			UDOT's Noise Abatement Policy states that a traffic noise impact occurs when either (1) the future worst-case noise level is equal to or greater than the UDOT noise-abatement criterion (NAC) for a specified land-use category or (2) the future worst-case noise level is greater than or equal to an increase of 10 dBA over the existing noise level. Neither the existing conditions or the modeled future noise levels at the Palisades Acres receptors were over the UDOT NAC levels, and none of modeled future noise levels were greater than or equal to an increase of 10 dBA over the existing noise levels (for more information, refer to receptors A-44 through A-48 in the Bangerter Highway at 13400 South Intersection Improvements Noise Study). For this reason, this neighborhood would not incur traffic noise impacts according to UDOT's noise-abatement policy. According to UDOT's noise-abatement policy, noise abatement will be considered and evaluated only in areas where traffic noise impacts are identified. Because there were no impacts in the Palisades Acres area, no noise-abatement measures were considered or evaluated. Noise walls were evaluated on the north side of Bangerter Highway from approximately 13650 South to 13750 South because there were modeled impacts in this location where the homes are closer to Bangerter Highway. As discussed in the FHWA Traffic Noise Analysis and Abatement Policy and Guidance, highway traffic noise levels are not substantially increased by construction of a noise barrier on the opposite side of a highway from a receiver. If both the direct noise levels and the reflected noise levels are not abated by natural or artificial terrain features, the noise

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			increase is theoretically limited to 3 dBA due to a doubling of energy from the noise source. In practice, however, not all of the acoustical energy is reflected back to the receiver. Some of the energy is diffracted over the barrier, some is reflected to points other than the receiver, some is scattered by ground coverings (for example, grass and shrubs), and some is blocked by the vehicles on the highway. Additionally, some of the reflected energy to the receiver is lost due to the longer path that it must travel. Attempts to conclusively measure this reflective increase have never shown an increase of greater than 1to 2 dBA, an increase that is not perceptible to most people. The existing noise wall on the south side of Bangerter Highway along 13800 South was constructed during the initial construction of Bangerter Highway in this location. There was no highway adjacent to those receptors before the construction of Bangerter Highway. As a result, those receptors experienced at least a 10-dBA increase in noise with the construction of Bangerter Highway and qualified for an evaluation of mitigation.
29.	Trudy Fegel (Public Hearing, Verbal Comment)	So I am hoping that they will re-evaluate and look at putting a sound wall up between where my neighborhood is in Bluffdale. We're in the Ivory Palisade Acres development, and it is between 134th and 2700 West. And they've got a sound wall going in on the north side, but there also needs to be one on the south side. What we're worried about as a community is that we will have the sound kind of reverberate off the other wall and make it louder than it already is in our neighborhood. And it sounds like, from discussing it with some of the people here,	UDOT has developed a noise-abatement policy for transportation projects, which conforms to the Federal Highway Administration's (FHWA) noise-abatement requirements in 23 Code of Federal Regulations (CFR) Part 772. The Palisade Acres neighborhood was included in the noise study as part of the Bangerter Highway at 13400 South State Environmental Study. The five Palisades Acres homes nearest to Bangerter Highway were considered receptors in the noise study area (for more information, refer to receptors A-44

No.	Name (Comment Method)	Comment	Response
		that they have not done the environmental impact studies on our side of the street. So I would hope that they would be able to do that.“	through A-48 in the Bangerter Highway at 13400 South Intersection Improvements Noise Study). The Palisades Acres homes located farther south of 13800 South were more than 500 feet from the project and were outside the noise study area. A sound-level meter was used to measure noise levels at six locations throughout the project area. Recorded measurements were used to validate the noise model. To be considered valid, the field noise measurements must be within 3 A-weighted decibels (dBA) of the model’s predicted noise. As described in Section 3.3 of the noise study, the model validation results range between 0 and 3 dBA, so the noise model is considered valid. Existing noise levels were established via noise modeling for receptors located adjacent to, and approximately 500 feet from, Bangerter Highway and 13400 South. Existing traffic sound levels for receptors in this area were calculated with the FHWA Traffic Noise Model (TNM) version 2.5 software using existing conditions (travel lane configurations and level of service [LOS] C traffic volumes traveling at the posted speed limit). Projected traffic noise levels for the three project options were calculated with TNM version 2.5 software using the design of the three project options LOS C traffic volumes traveling at the posted speed limit. To be consistent with UDOT’s Noise Abatement Policy, LOS C traffic volumes were used to determine the greatest hourly traffic noise conditions that are likely to occur regularly. UDOT’s Noise Abatement Policy states that a traffic noise impact occurs when either (1) the future worst-case noise

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			the acoustical energy is reflected back to the receiver. Some of the energy is diffracted over the barrier, some is reflected to points other than the receiver, some is scattered by ground coverings (for example, grass and shrubs), and some is blocked by the vehicles on the highway. Additionally, some of the reflected energy to the receiver is lost due to the longer path that it must travel. Attempts to conclusively measure this reflective increase have never shown an increase of greater than 1to 2 dBA, an increase that is not perceptible to most people. The existing noise wall on the south side of Bangerter Highway along 13800 South was constructed during the initial construction of Bangerter Highway in this location. There was no highway adjacent to those receptors before the construction of Bangerter Highway. As a result, those receptors experienced at least a 10-dBA increase in noise with the construction of Bangerter Highway and qualified for an evaluation of mitigation.
30.	Janis Horman (Email)	Hello. It's been brought to my attention that UDOT has not properly conducted the sound study at 134th and Bangerter and also have left Bluffdale City out of the loop regarding the process. There have been several city council meetings where this has been disclosed to the residents of Bluffdale. It's disappointing that decisions are being made without the proper review and informing those that it affects. I live in a neighborhood just south of that area right on the frontage road. I've witnessed multiple accidents along the bend of the road, (photo below), sounds of sirens, trucks at 6 am and throughout the day using their jake break to stop at 2700	UDOT has developed a noise-abatement policy for transportation projects, which conforms to the Federal Highway Administration's (FHWA) noise-abatement requirements in 23 Code of Federal Regulations (CFR) Part 772. The Palisade Acres neighborhood was included in the noise study as part of the Bangerter Highway at 13400 South State Environmental Study. The five Palisades Acres homes nearest to Bangerter Highway were considered receptors in the noise study area (for more information, refer to receptors A-44 through A-48 in the Bangerter Highway at 13400 South Intersection Improvements Noise Study). The Palisades Acres

No.	Name (Comment Method)	Comment	Response
		west and now the constant sight of the traffic backed up going to Herriman. It sounds like the sound wall was approved on the North side of Bangerter at this area but not the south which all that will do is amplify the sound. If was approve on one side, why was it not approved for the other when it will make the sound louder and travel back. I anticipate over the next several years for this to just worsen with the constant development that is occurring at Mountain West Corridor along with the approved neighborhood around the area. Please reconsider and perform the sound study as a proper review and discuss with the people it will affect. I appreciate your time in reviewing this and hope to have a positive resolution for all involved.	homes located farther south of 13800 South were more than 500 feet from the project and were outside the noise study area. A sound-level meter was used to measure noise levels at six locations throughout the project area. Recorded measurements were used to validate the noise model. To be considered valid, the field noise measurements must be within 3 A-weighted decibels (dBA) of the model's predicted noise. As described in Section 3.3 of the noise study, the model validation results range between 0 and 3 dBA, so the noise model is considered valid. Existing noise levels were established via noise modeling for receptors located adjacent to, and approximately 500 feet from, Bangerter Highway and 13400 South. Existing traffic sound levels for receptors in this area were calculated with the FHWA Traffic Noise Model (TNM) version 2.5 software using existing conditions (travel lane configurations and level of service [LOS] C traffic volumes traveling at the posted speed limit). Projected traffic noise levels for the three project options were calculated with TNM version 2.5 software using the design of the three project options and LOS C traffic volumes traveling at the posted speed limit. To be consistent with UDOT's Noise Abatement Policy, LOS C traffic volumes were used to determine the greatest hourly traffic noise conditions that are likely to occur regularly. UDOT's Noise Abatement Policy states that a traffic noise impact occurs when either (1) the future worst-case noise level is equal to or greater than the UDOT noise-abatement criterion (NAC) for a specified land-use category or (2) the

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			to points other than the receiver, some is scattered by ground coverings (for example, grass and shrubs), and some is blocked by the vehicles on the highway. Additionally, some of the reflected energy to the receiver is lost due to the longer path that it must travel. Attempts to conclusively measure this reflective increase have never shown an increase of greater than 1to 2 dBA, an increase that is not perceptible to most people. The Bluffdale city engineer and city manager were sent an email notification regarding the public hearing. In addition, the project team has met regularly with Bluffdale City while planning for the project.
31.	Edward St Louis (Website)	The study says that people wait in traffic for about 60 seconds during peak times. That is inaccurate for the people traveling west on 13400 S crossing the intersection. It often gets backed up to about 3600 W and takes 4-8 minutes to make it through the intersection. I advocate for the below grade or hybrid intersection. Building up a huge ramp makes sound carry much further and is an eye sore. I'd also suggest prioritizing funding on the "future" sound barriers to get them done as soon as possible. Thank you!	The decision regarding which grade-separated interchange is selected (over, under, or hybrid option) will be made at a later date based on funding and coordination with Riverton City. Once a decision is made, UDOT will communicate this decision using various outreach channels. Some of the improvements identified as part of the Proposed Action are not expected to be constructed in 2023 unless additional funding is available. These improvements include adding a dual northbound off-ramp, extending the southbound on-ramp east of 3600 West, constructing auxiliary lanes between the 13400 South northbound on-ramp and the 12600 South northbound off-ramp, and constructing auxiliary lanes between the 12600 South southbound on-ramp and the 13400 South southbound off-ramp. If the auxiliary lanes are constructed, a noise wall would be added on the east side of Bangerter Highway from about 13650 South to 13750 South near the clear zone for northbound Bangerter Highway traffic and across the bridge

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			that spans 3600 West. This wall would be constructed only if funding is available for extending the northbound off-ramp and southbound on-ramp east of 3600 West and balloting is approved.
32.	Amanda Gallacher (Website)	I believe this interchange is totally necessary. The increase traffic in this part of the valley is insane. So making bangerter a freeway is a smart move. I think the 134th interchange should be the hybrid option. Most people would just pick the cheapest which would also work. But I think since 126th south is already the hybrid option the 2 main interchanges of Riverton would match. No more confusion on different kinds of intersections. I've lived here all 31 years of my life. I love Riverton so dang much. Make sure you give a fair upstanding price to the people and business affected.	The decision regarding which grade-separated interchange is selected (over, under, or hybrid option) will be made at a later date based on funding and coordination with Riverton City. Once a decision is made, UDOT will communicate this decision using various outreach channels.
33.	Justin Jamison (Email)	Hi, I have a several comments and concerns about the 13400 S interchange project. I am primarily concerned about the left turn exit ramp from northbound Bangerter Highway onto westbound 13400 S, and the eastbound on-ramp onto southbound Bangerter Highway. The current project plan calls for adding a third lane to that westbound exit to accommodate traffic into 2050. However, I believe that this westbound exit needs to be converted into a highway overpass bridge of its own, that merges into westbound 13400 S with no stops. There are numerous reasons why this should be done:	The traffic analysis shows that a grade-separated single-point urban interchange (SPUI) with three northbound left-turn lanes, one southbound left-turn lane, two eastbound left-turn lanes, one westbound left-turn lane, one northbound right-turn lane, two southbound right-turn lanes, one eastbound right-turn lane, and one westbound right-turn lane is needed to meet 2050 traffic demands at the intersection of Bangerter Highway and 13400 South. The traffic analysis also showed the need for two eastbound and two westbound through lanes on 13400 South. In addition, as a response to public and city comments, a second eastbound to southbound on-ramp lane was added to the design. This second southbound on-ramp lane will be accessed from an eastbound through/right-turn option lane.

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		In the evening commute hours, that left turn exit onto 13400 S sees cars backing up all the way to the Riverton City fishing pond on most days. This is a clear indication that this interchange (and specifically that westbound exit) is already in failure status. The exit from northbound Bangerter Highway onto westbound 13400 S usually has MANY more cars waiting during the red light than both northbound and southbound Bangerter Highway COMBINED. This demonstrates that that exit corridor is a more important traffic path than even the main Bangerter corridor. Westbound traffic on 13400 S that attempts to cross Bangerter highway is horrendous during the evening commute. This is not primarily because of competition with north-south traffic on Bangerter. Rather, it's primarily because of the conflict with the northbound exit onto westbound 13400 S. There are NO east-west corridors that run through the ENTIRE CITY of Bluffdale that allow traffic from the I-15 corridor to get into Herriman. In fact, the only meaningful east-west corridors in the entire region are Bangerter Highway and Mountain View Corridor. Mountain View Corridor is significantly limited in its ability to alleviate traffic flows entering Herriman City, because it has not yet been properly connected to the I-15 corridor anywhere in Salt Lake County (the Porter Rockwell bridge will help marginally, but by itself it will be insufficient). If this project is to sustain anticipated traffic volumes through 2050, it is grossly insufficient for what is planned in Herriman. The high-density Olympia development is planned	The Wasatch Front Regional Council (WFRC)/Mountainland Associated of Governments (MAG) travel demand model was used to predict future travel and traffic volumes for the project area. In consultation with the region's Cities, WFRC and MAG prepare future land use projections. These projections are used by WFRC to develop the *Wasatch Front Regional Transportation Plan* (RTP), which is the plan for the development of the area's future transportation system. The RTP includes a list of projects that are planned to meet future transportation needs over a horizon of 30+ years. Although WFRC coordinates with local jurisdictions in preparation of the land use projections, some adjustments were made to the 2050 projections for the Bangerter Highway at 13400 South traffic model to account for the latest approved plans for Olympia Hills and Daybreak and to reflect additional households and employment beyond what had been assumed in the RTP.

No.	Name (Comment Method)	Comment	Response
		for western Herriman, which by 2030 will add significantly to the westbound traffic on this section of 13400 S. That development alone will put this current interchange plan into an instant failure status. Given all the reasons above, I would urge the project team to amend the project plan and add a northbound exit ramp that will merge into 13400 S going westbound. It is imperative that this work be completed as this corridor is the primary east-west corridor that feeds the entire city of Herriman. Additionally the eastbound-to-southbound on-ramp onto Bangerter Highway will also be insufficient with only one lane. Currently, the on-ramp has 2 lanes (one of which is shared with eastbound 13400 S) and already the morning commute traffic is horrendous trying to get onto Bangerter Highway. The morning commute won't be sustainable into 2050 with only one lane for an on-ramp here. I would strongly urge the project team to revise the design to include at least 2 on-ramp lanes onto southbound Bangerter Highway from eastbound 13400 S, although 3 or more would be ideal. Please let me know if this is possible, and if not, what possible steps could be taken to improve east-west traffic flow from Bangerter Highway onto western 13400 S.	
34.	Dan Fegel (Email)	Senator McCay, Brian, Marcus and others. I have taken the opportunity to review the noise sound levels for the project above and I have found inconsistencies between modeled sound level measurements and actual sampled sound level measurements as it relates to Receptor	A sound-level meter was used to measure noise levels at six locations throughout the project area. Recorded measurements were used to validate the noise model. To be considered valid, the field noise measurements must be within 3 A-weighted decibels (dBA) of the model's predicted noise. As described in Section 3.3 of the noise study, the

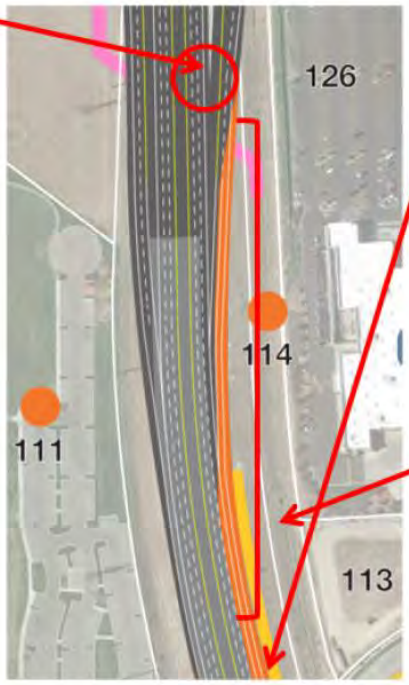
No.	Name (Comment Method)	Comment	Response
		A-048, found in the impact study for Project No: S-0154(92)0, dated December 2021. The report indicates that the UDOT NAC at the receptor was modeled at 61 dBA. This is inaccurate. Actual sound levels at receptor A-048, during the last 15 min of morning rush hour traffic midweek, averaged 67-69 dBA with peak levels greater than 72 dBA. This was identified with instrumentation set to the NIOSH standard, with a 3 dB Exchange rate, Fast Time weighting. This leads me to believe that there were errors within the modeling. Without the ability to review the specifications which HDR is required to follow in the determination of the sound levels, it is difficult to identify and specific causation. From the reports it is easy to see at least 50% of the measurements were taken at non peak traffic times where the monitor was not in line with the direction of hwy traffic. Monitor location during the sampling was also all over the place. Some areas monitored were right next to Bangeter and in other areas monitoring was placed so far from Bangeter that it would be difficult to identify the difference between background noise and actual traffic noise from Bangeter. Again the reason for these differences are unknown as I haven't reviewed the specifications for the required monitoring, but as a Safety and Health professional who has done my share of these measurements. I can clearly see either incompetence, bias or a bit of both in the monitoring report as shared. I would like to know where I can get the specifications for the noise impact study, the field report details and data that	model validation results range between 0 and 3 dBA, so the noise model is considered valid. Existing noise levels were established via noise modeling for receptors located adjacent to, and approximately 500 feet from, Bangerter Highway and 13400 South. Existing traffic sound levels for receptors in this area were calculated with the FHWA Traffic Noise Model (TNM) version 2.5 software using existing conditions (travel lane configurations and level of service [LOS] C traffic volumes traveling at the posted speed limit). Projected traffic noise levels for the three project options were calculated with TNM version 2.5 software using the design of the three project options and LOS C traffic volumes traveling at the posted speed limit. To be consistent with UDOT's Noise Abatement Policy, LOS C traffic volumes were used to determine the greatest hourly traffic noise conditions that are likely to occur regularly. "Actual" sound levels vary all the time. For example, using a short-term event like a motorcycle or ambulance passing by for the baseline data would not be representative of more common conditions. The UDOT noise analysis process is intended to capture conservative (meaning probably louder than normal) noise conditions (LOS C traffic volumes in both directions at the same time). UDOT uses these modeled noise levels to consistently evaluate noise impacts and noise walls for all of their projects. The noise monitoring and noise modeling followed the specifications in UDOT's Noise Abatement Policy and FHWA's Traffic Noise Analysis and Abatement Policy and Guidance. Copies of the field monitoring data sheets and monitoring

No.	Name (Comment Method)	Comment	Response
		was acquired. I would also like to see the qualifications of the individuals performing and reviewing the sampling protocols, plans and the logic to determine baseline information. Additionally, I would like to know the program and software version in the manufacture of the report. I would also like to know who signed off on this survey. Thank you for your time, I look forward to your response. Respectfully,	results are included in Appendix A of the Bangerter Highway at 13400 South Intersection Improvements Noise Study. UDOT reviewed and approved the noise-monitoring approach and noise-monitoring locations prior to the noise monitoring.
35.	Marcus Johnson (Email)	Thank you Dan, I am the resident at A-48 (3419 West 13800 South). I would like to be included on these comments as my comments as well. Though I do not have the sophisticated equipment that either Dan Fegal or UDOT has, I can tell you that even the increased traffic since we moved in 4 years ago has made it difficult to host much of anything outdoors. I would like to request a reconsideration for a noise barrier. If there is any way for funding sooner, I would like that considered as well. Thank you senator and all from UDOT for taking the time to consider our concerns and address our questions. Marcus Johnson	Please see the response to comment 34.

Comment #11, Attachment 1

1) 13400 Exit heading Northwest from the Bangerter Highway (adjacent to the Walmart)

Cars will attempt to cut in here **as they do now** at the existing 134th west exit to avoid the back up during rush hour, creating a very dangerous situation.



It appears that you have planned for a very long exit lane, which is great!

Based on Olympia Hills and explosive growth in Herriman, this exit will continue to be a tremendous bottleneck during rush hour – even with the bridge.

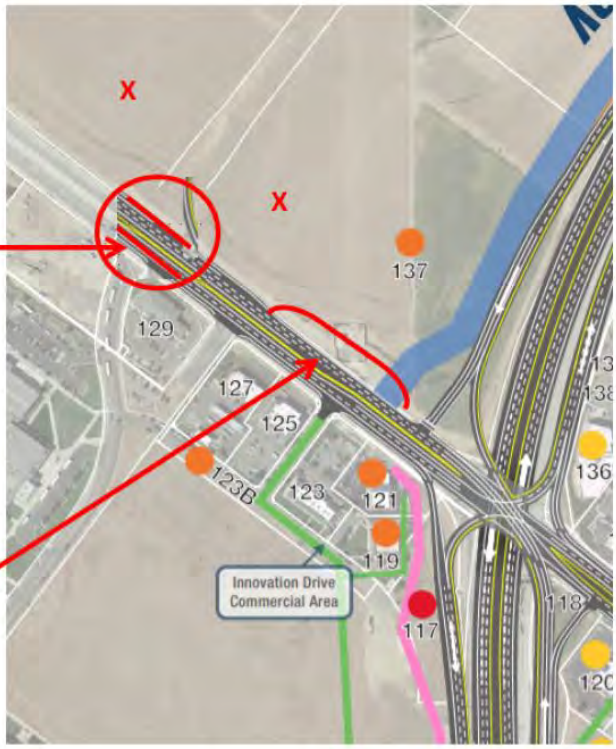
Please give thought to making it a two lane exit much sooner to avoid a long line of idle cars, thus contributing to the drivers that will try to cut in at the last second. Also consider adding a barrier to prevent the cars from cutting in between the exit and the right lane on the Bangerter.

Comment #11, Attachment 2

2) 13400 West after exiting the Bangerter Highway from Either Direction (Near Maverick Station)

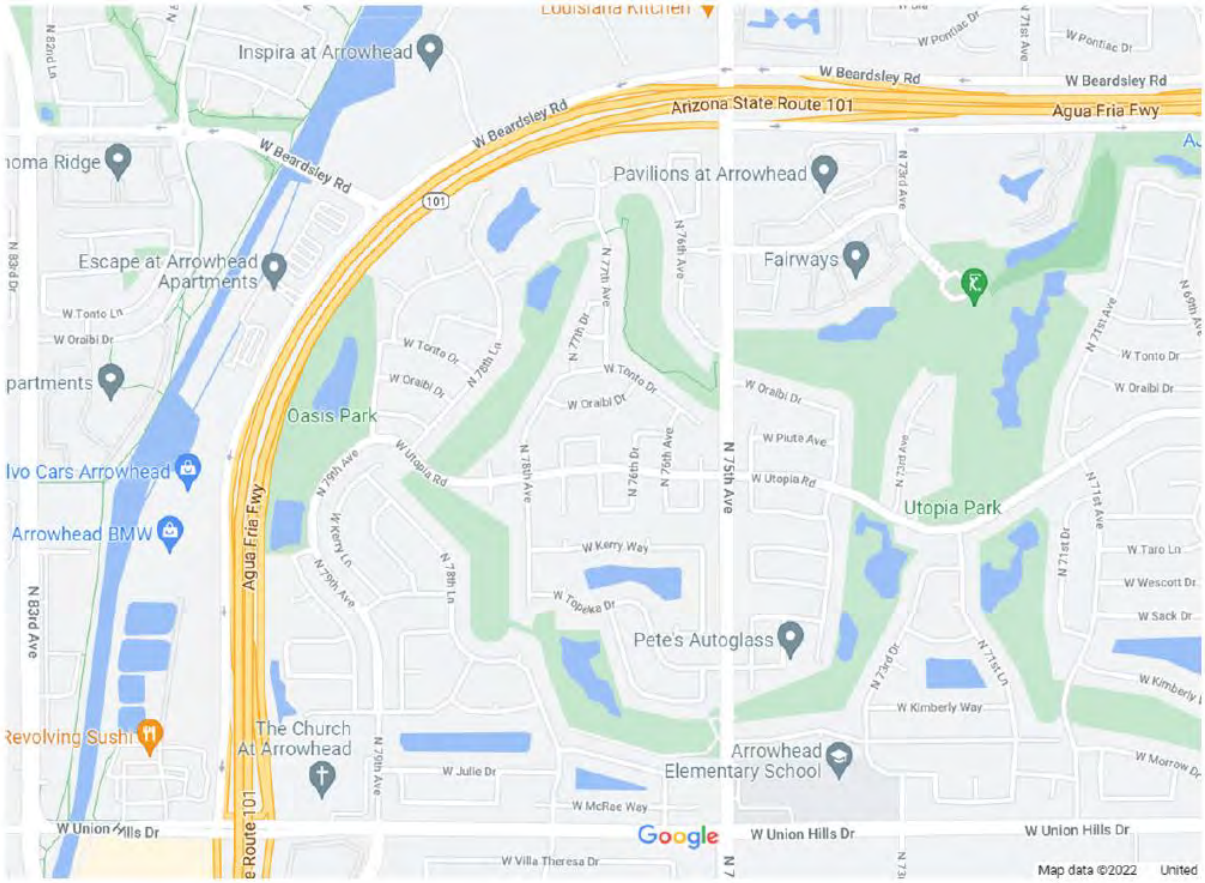
This area that is just west of the interchange needs to be considered in your plans and coordinated with the city of Riverton and the landowners of the Mountain View Village (or current owner). An overpass bridge at this exit on the north perpendicular to the Maverick gas station would alleviate a lot of issues that your work will not solve. This area backs up immediately as cars exit the Bangerter. With these cars exiting the Bangerter from the south attempting to get over three lanes to turn at the Maverick station, plus the large commercial area planned by red **X**s, it will only compound problems in the very near future.

Why is this area only two lanes? It should be three much sooner to avoid a back up.

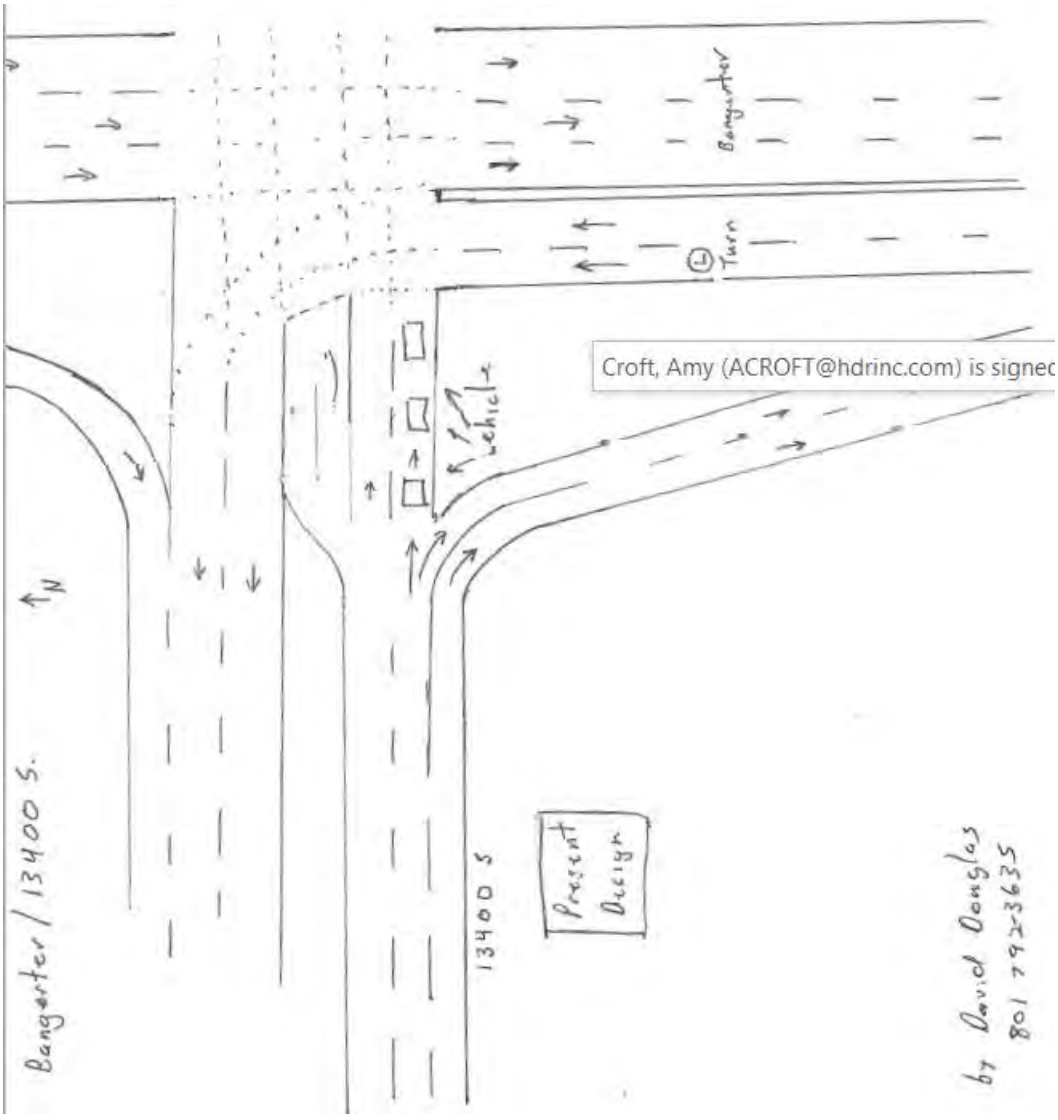


Comment #11, Attachment 3

For Reference. This detail does not show the Texas U turns and other exits and challenges. It is only for reference, but with some similar challenges.

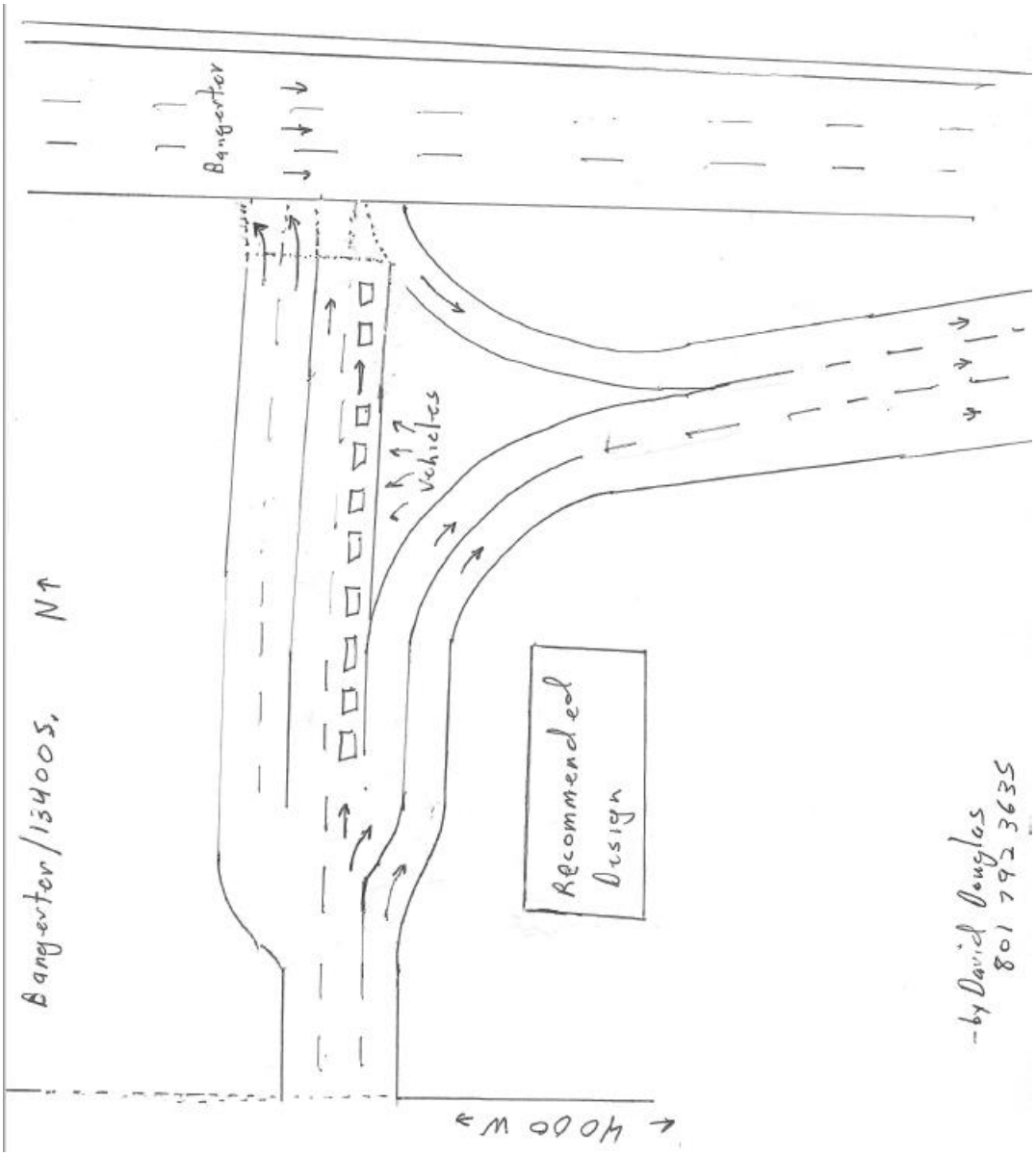


Comment #23, Attachment 1



Croft, Amy (ACROFT@hdrinc.com) is signed

Comment #23, Attachment 2



Comment #23, Attachment 3

